LIFE SKETCHES OF GREAT PHYSICIANS

DONALD T. ATKINSON, M.D.

With compliments of the Season
Sincerely
A. J. Altkenhead

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BY

DONALD T. ATKINSON, M.D.

FELLOW OF THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY, LIFE MEMBER OF THE AMERICAN MEDICAL ASSOCIATION OF VIENNA, MEMBER OF THE AMERICAN MEDICAL, THE SOUTHERN MEDICAL, THE NATIONAL TUBERCULOSIS AND THE AMERICAN SOCIAL HYGIENE ASSOCIATIONS. AUTHOR OF "A TREATISE ON CATARACT," "GREAT MEDICAL INNOVATIONS," "ADENOIDS AND KINDRED PERILS OF SCHOOL LIFE," "A SOCIAL AND ECONOMIC CONSIDERATION OF VENEREAL DISEASES (SOCIAL TRAVESTIES AND WHAT THEY COST)," ETC., ETC.

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PUBLISHERS

DEDICATED TO MY ESTEEMED FRIEND,

EDWARD CRAWFORD LONG,

HONORED SON OF

DR. CRAWFORD WILLIAMSON LONG,

DISCOVERER OF ANÆSTHESIA.

PREFACE

A dozen years or more ago, as the author of these essays began to read medical history for diversion and relaxation, he formed the habit of making random notes of incidents which particularly interested him. Since that time it has been his privilege to make two visits to England where, in the Library of the British Museum, he found a number of rare books and manuscripts relating to the subject of medieval medicine and where the notes gradually took form, without any idea, however, of their publication. It was only during recent months that the notes assumed the shape with which they are now offered to the publisher.

The essays delineate the lives of a group of very determined men whose dogged perseverance was pitted against obstacles for the time being unsurmountable but whose unceasing exertion exercised an influence on medical thought of future generations so dominant as to entirely revolution-

ize medieval and later medicine. It is interesting to note that, while the inspiration given to science during the lives of these pioneers of thought was not great, the result of their labors manifests itself today in every country in the world where medicine is a science. To every thoughtful person the teachings and achievements of these men, so long denounced, will be regarded as the nucleus around which has grown practically every department of scientific medicine.

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EGYPT, the birth place of medical science was, until a century and a half ago, a land clothed in mystery. Aside from its massive architecture and the fact that it once had been the residence of Moses and his people, little was known of the country, and in consequence, it held very little interest for the world.

In seventeen hundred and ninety-eight the Rosetta stone was discovered and later was deciphered by Champoleon. Then the long forgotten tombs were reopened and antiquities innumerable, preserved intact by the marvelously dry climate, were examined with a new interst. Garments of the kings, tapestries, household articles and vestments of the priests were reclaimed almost in their pristine condition. Pictures delineating the early life of the people were found by hundreds in the sarcophagi and great masses of papyri bearing the writings of the scribes were taken from the bodies of the mummies.

Myth steadily gave way as these papyri were deciphered. With each translation some mistaken tradition was cast aside and a fact put in its place. Now a voluminous Egyptian literature is at hand carrying the history of Egypt back over seven thousand years and giving us more knowledge of the country, even at that early date, than we have of England during the Round Table days of King Arthur. In the light of this new knowledge we cannot but look upon Egypt as the cradle in which was rocked the science of the world.

From the first dynasty onward Egypt had a system of medicine more rational than the world was again to see for over three thousand years. Egyptian physicians, famous as teachers, visited and taught in Arabia, Persia and Greece. Hippocrates, grandfather of the great physician by that name, was the pupil of an Egyptian. Medical knowledge in Greece, being always fused with Egyptian teaching, was handed down from father to son as a family heritage. In this way Egyptian medicine became the ground work of Greek medicine as given us by Hippocrates.

For centuries Hippocrates has been called the "father of medicine." We know now that many

physicians contributed to the science before he lived, that he was more a collector of the current knowledge of his day than an originator, and that the art which he practiced was largely an Egyptian product. From the Ebers Papyrus, discovered and deciphered some fifty years ago, we learn that the celebrated Hippocratic oath is but a résumé of the ethical admonitions formulated by the physicians of Thebes sixteen centuries before the Christian era. The renowned Egyptologist, Mr. Sayce, after a minute examination of this document says that medical and surgical knowledge was as far advanced at the time of its writing as it was during Galen's time some thousands of years afterward.

In Egyptian tombs a number of treatises have been found devoted to the treatment of the eye, which indicate that the Egyptians were the earliest opthalmologists. That their skill was recognized by the royalty of surrounding countries is borne out by a Persian tablet in the British Museum which states that Cyrus, the Persian King, imported an Egyptian oculist to treat the eyes of his mother. In this same institution is a papyrus giving a formula for the relief of inflamed eyes.

It contains myrrh, oxide of copper, antimony and white oil, with the following directions for preparation and use: "Place in water, let stand for one night, straining through a cloth, and smear over the eyes five days". It is probable that this remedy was used in their prevalent disease, trachoma.

The Egyptians were first to realize the importance of dividing the practice of medicine and surgery into specialties. Herodotus tells us that "each physician treats a single disorder and no more. Thus the whole country," he states, "abounds with medical practitioners, some undertaking to treat diseases of the eye, others the head, others again the teeth, others of the intestines and some those complaints which are not local." Manetho, the historian, mentions the fact that Athothor Atuti wrote books on anatomy and surgery. This assertion is borne out by records, recently translated, which indicate that the Egyptians knew more of anatomy than did the Europeans of the middle ages. They had an acquaintance with the viscera and knew the functions of the lungs, the heart and arteries. Pythagoras, the great Greek physician and

philosopher, stated that he acquired his knowledge of medicine and anatomy from the Egyptian Priest, Alkmaeon, who is known to have written extensive treatises on anatomy and whose writings on physiology are the oldest in existence.

The Egyptians were skilled in the art of making artificial teeth. A knowledge of this science was in the hands of the Greeks and Romans at the time when the decadence of all science began. With few exceptions we do not hear of it again in history for over fifteen hundred years.

The Greeks made great progress in the art of medicine, but no renowned physicians ever grew up in Rome. The Patricians especially despised medical men. They were looked upon as a class preying upon the misfortunes of others and it was thought by many of the Romans that to employ them was to invite death itself.

Pliny states that "The dignity of the Roman does not permit him to make a profession of medicine and the few Romans who begin to study it are venal renegades to the Greeks," and to his son he wrote, "The race of Greece is very vicious; and, my son, believe this as the voice of an oracle, that, with its literature it will spoil everything in

Rome. It will be worse still if it sends us its physicians. They have sworn among themselves to kill all other nations with their medicines. They exercise their art for sake of gain, and seek to get our confidence in order to be able to poison us the more easily. Remember, my son, that I charge you to have nothing to do with physicians." With this sentiment fastened upon the minds of the upper classes in Rome it is not strange that the country made no progress in medicine.

Galen, whose name is inseparably linked with medicine, was not a Roman but a Greek. His voluminous works, written in Rome, cover anatomy, physiology, pathology and pharmacy. He is said to have written sixteen essays on the pulse. While a number of fanaticisms appear in his writings, his conclusions were founded on a keen observation and native common sense. He was the first to differentiate between pneumonia and pleurisy and to describe phthisis and he portrayed accurately the classic signs of inflammation. He was the first to describe the veins and the aorta, to demonstrate the coats of the arteries and to hint that the arteries carried not air but blood. Galen divided the vertebræ into the cervical, dorsal and lumbar re-

gions and classified the bones of the cranium. The modern student of osteology, minutely tracing out the intricacies of the sphenoid bone, is but following the footsteps left by the great Greek hundreds of years ago.

But Galen was the last great physician of ancient times. At his death we find the Roman Empire already decadent. With its sun of glory about to set it was soon to plunge, with the world, into that abyss of mental stagnation spoken of as the dark ages. A barbaric night was about to settle upon Europe. Its influence slowly and surely was to grapple with and strangle the half-grown science of medicine. This grip of ignorance was to submerge all scientific effort and was not to be released for sixteen hundred years. During this time thought was to be a crime and mentally man was to become a machine. For hundreds of years the learning of Greece and Rome was to be submerged in ignorance and superstition. Medicine in Christian Europe was to become the function of ecclesiasticism and was to give way to amulets, charms and incantations. The science of hygiene was to be forgotten, surgery was to be despised,

and its practitioners ostracised, human dissections were to be forbidden, science was to fly to its last fortress, Alexandria, Alexandria was to fall and an intellectual night was to cast its gloomy pall over the world.

For several centuries the devotees of religion, both Christian and Mohammedan, were unfriendly to science, philosophy and art. The library at Alexandria, in which was stored the accumulated knowledge of centuries, was burned to the ground by the Arabians. The Mohammedans committed their depredations under the pretext that all books differing with the Koran were pernicious and that those agreeing with it were superfluous. In Rome the Christians zealously employed themselves in destroying pagan art and pagan literature. Greek medical manuscripts and their later translations were put under the ban and were burned wherever found. Had they been preserved, Europe, to a degree at least, might have been saved the orgy of ignorance and superstition relating to medicine which was to last for many centuries.

From a scientific standpoint this gulf of unenlightenment was bridged by the Arabians. In

the Greek cities of Asia-Minor, then under Mohammedan control, a great mass of Greek literature, both philosophic and scientific, had escaped the mania of incendiarism. After the death of Mohammed these manuscripts were translated into Arabic and grew greatly in favor. An Arabian renaissance, preceding the European renaissance by hundreds of years, may be said to have taken place and original Greek manuscripts brought fabulous prices. The philosophy of Greece and Greek science was eagerly studied and the countries under Moslem rule became the centers of culture and education. Between the years six hundred and thirty-eight and six hundred and forty-three A. D. the Arabians gradually forged their way across Northern Africa and in seven hundred and eleven, invaded Europe. For centuries they were the masters of Spain and Western France. During this period of Arabian invasion the Jews sprang into great prominence in medicine, a prominence which has since steadily grown. The Arabians offered a refuge to the persecuted Jews and opened their universities to them. Naturally this advantage was welcomed

because of the fact that many Christian Medical Universities excluded the Jew. The Jew in Christian Europe was to face this handicap for many years. In the thirteenth century the Austrian universities were closed to him and soon other Christian universities followed this example. In twelve hundred and sixty-seven the council of Vienna made it a felony to employ a Jewish Physician. Soon in other portions of Europe penalties were imposed upon those employing the Jews as medical practitioners in their families. Naturally the Jews with scientific inclinations gravitated to countries under Mohammedan rule and there engaged in medical practice.

Soon the Jew with his analytical mind outstripped his contemporaries. He was a rationalist and thus was saved the handicap of the general superstition of the time. When Mohammedan and Christian alike were frowning upon the desecration of the body, he was assiduously pursuing laboratory investigations and was performing human dissections. This independent thought and study gave him an impetus so great that his name remains emblazoned upon nearly every scientific achievement. To such an extent is this true that

we may well look upon the Jewish race as the Savior of the science of medicine.

NOTE. For an acknowledgment of the debt due the Jews for the development of medical science refer to "History of Rationalism in Europe" by Lecky.

VESALIUS AND ANATOMY

VESALIUS AND ANATOMY

HUMANITY moves in a dull procession but its ultimate goal is progress. Since the dawn of history the world's institutions have been in constant change. Every step forward has been paved by the sacrifice of some fearless thinker, some one who possessed sufficient courage to cast aside the intellectual dross of his age to cling to what his senses demonstrated. For thousands of years, reason, investigation, and common sense, anything in fact which interfered with the prejudice of the past, was greeted with disfavor. Conscience during that period was the conscience of church and state. Personal convictions, however honest, were trampled upon and freedom, as we understand it, was unknown. A new idea bursting into light, when not favored by those in power, was stifled. Research, when not forbidden entirely, was under the ban of censorship. Freedom of intellect was not tolerated, all unconventional thoughts were frowned upon and conclusions out of harmony with

the moss-grown ideas of antiquity were denounced. Intolerance was supreme, an intolerance which presupposed that everything was known that could be known, that conventional ideas were sacred and that investigation was a crime.

As a result of that liberty of thought which was born with political liberty, science has advanced more during the past one hundred years than it did in the preceding four thousand years. We owe much of this advancement to isolated individuals who failed, but who attained in their defeat more than they could ever have hoped to accomplish by victory. The saviors of medicine have been those who, with heel upon prejudice, have been unafraid to face the world with its jeers and jibes, have disdained persecution and with truth as their guide, have been unappalled even by death. Such men have transformed a medieval superstition into a science.

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In the year fifteen hundred and forty-three strange rumors were afloat in Italy. It was reported that Vesalius, a young surgeon of Padua,

had come forward heretically proclaiming that anatomy, as taught by his contemporaries, was a maze of inaccuracies founded upon the mistakes and superstitions of the ancients. For thirteen hundred years all disputes in anatomy had been referred back to Galen. Everything not in harmony with Galenic teaching had been cast aside. From Galen, as from a supreme court, there had been no appeal.

For centuries Galen's anatomy had been maintained by a reverence for the past which had seemed to block all progress in anatomical study. Let us not blame Galen for this. Not a line appears in his writings tending to uphold a veneration for the teachings of antiquity. Galen was himself an iconoclast, and for his innovations in medicine was compelled to leave Rome in haste, after crouching in the dark alleys so as to escape the fury of the mob. Galen's studies in anatomy were carried far in advance of his time, but it is doubtful if he ever performed a human dissection. Shaping his deductions as he did, in the light of pure theory, it is nothing but natural that his conclusions should have been visionary and unsound. The many mistakes which appear in his works

would not have been there had his opportunities been greater.

According to the Galenic text the function of the left ventricle of the heart is to produce "vital spirits" which are changed to "animal spirits" by the blood; the blood passes from the left to the right ventricle of the heart through an imperceptible opening and the function of the veins is not to carry blood but chyle. Galen believed that man was possessed with an intermaxillary bone, that his femurs are curved and that the human eye has three humors and seven coats. He held a number of fanciful ideas in regard to humors and spirits of the body which have lived in all modern languages, though the mistakes on which they were founded have long since passed away. Since the days of Vesalius the pendulum of opinion regarding the work of Galen has swung so in the opposite direction that reverence has given way to an unjust disparagement. In speaking of the mistakes of Galen, then, we should not forget that his progress in anatomy was impeded by the same spirit which held Vesalius in check and that Galen lived centuries ago.

Andreas Vesalius was born in Brussels in fif-

teen hundred and fourteen. In the same city he began his anatomical studies some seventeen years later, guided by the Galenic text and the dissection of animals. At that time human dissection of the dead human body was forbidden by law. Vesalius was just rounding off his nineteenth year when it came to his ears that over in Paris a certain Jacobius Sylvius had received permission to dissect the bodies of criminals. Soon we find him duly installed as one of Sylvius' pupils. What part he had in demonstrating the fissure by that name we do not know, but we do know that he was an earnest student. That merit does not always win praise is made evident by the fact that Sylvius later denounced him for intimating that Galen had made mistakes.

Sylvius, a teacher de luxe, did not soil his hands with a cadaver. The actual dissection was done by barbers with that primitive instrument, the razor, and as the parts were exposed Sylvius clumsily demonstrated them at the point of a cane. It is said that Vesalius became so impatient with this bungling method that he often grasped the razor to more thoroughly expose the dissected parts.

Clinging to the ideas of Galen with a persistence characteristic of his age, Sylvius sought to bridge over the mistakes of the master with arguments to the effect that modern observation should have no weight as compared with infallible teachings. It began to dawn upon the young student that a man whose reason was submerged in traditional orthodoxy was not a safe teacher; so he left Paris and next we hear of him in Italy.

Vesalius arrived in Padua in fifteen hundred and thirty-seven. It appears that his genius was soon recognized for in the same year he was tendered the chair of surgery and anatomy in the university. Here he began the preparation of his great book "De Fabrica Humani Corporis" a work which was to make anatomy a science and was to bring upon its author's head the condemnation of the scientific world. To produce material for his plates he was, as Dr. White has said, a habitual haunter of gibbets. He bribed dead housekeepers and on more than one occasion became a grave robber. His book, richly illustrated with wood cuts, appeared in fifteen hundred and forty-three. With surpassing ability the old mistakes of anatomy were swept away

and structures never before discovered were dealt with with marvelous accuracy.

From a modern point of view one would think that such a work would be greeted with approval but the reverse is true. Vesalius was at once denounced as an imposter and a heretic. Sylvius, his old master hurled invective at him at Paris and his friends and students, swayed by popular sentiment, were human enough to hold him in derision and to forsake him. Greeted upon every hand with calumny and vituperation, with prejudice gaining and the law beginning to frown, Vesalius lost no time in leaving Padua. What fate might have befallen him had he remained is suggested by the case of Michael Servetus, who anticipated Harvey sixty-seven years by the following description of the circulation of the blood through the lungs:

"The vital spirit is generated by the mixture in the lungs of the inspired air with subtly elaborated blood, which the right ventricle sends to the left. The communication between the ventricles, however, is not made through the midwall of the heart, but in a wonderful way, the fluid blood is conducted by a long detour from

the right ventricle through the lungs, and when it is acted upon by the lungs and becomes red in color, passes from the Arteria Venosa into the Vena Arteriosa, whence it is finally carried by the diastole into the left ventricle."

The work of Servetus containing this extract, with certain theological opinions, written many years before Harvey was born was construed as an attack upon established order. When published in Paris it awakened a series of denunciations against its author so virulent that he was forced to flee from Paris. On his way to Italy he passed through Geneva, then the stronghold of Calvin and the reformation, where he was arrested and charged with heresy. What part Calvin had to do with the undoing of Servetus is controversial, but there is no controversy regarding the following verdict of the court at Geneva, "We condemn thee, Michael Servetus to be bound and to be led to the place of Champell, there to be fastened to a stake and burned alive, together with thy her-

NOTE. A very complete description of the trial and execution of Michael Servetus together with a copy of portions of his manuscript setting forth his theory relative to the circulation of the blood through the lungs is given by Victor Robinson in "Pathfinders of Medicine."

etical book, as well written by hand as printed, even until they be reduced to ashes, and thus wilt thou finish thy days to furnish an example to others who might wish to commit the like."

Servetus was burned on October 27th, 1553. In the spirit of the age Vesalius did well to flee.

After Vesalius left Italy we find him in Spain where he was made court physician to Charles V, but persecution was soon to follow. While performing an autopsy upon an eminent personage, some one claimed to have seen the heart palpitate under the knife. This was the long looked for opportunity of his enemies. He was carried before the inquisition on the charge of dissecting a living body. Through the influence of the court he escaped with a promise to atone for his crime by making a pilgrimage to the Holy Land. On his way back from Jerusalem, he was shipwrecked and died on the Island of Zante, the victim of privation and despondency.

The world has been blest and hampered simultaneously by two classes of thinkers; Those who,

NOTE. For the accusation of Vesalius to the effect that he had dissected a living body, and the persecutions which it created refer to "Vesalius" by Roth.

lacking the courage of conviction, have builded a wall of silence about themselves and those in whom the desire for self-expression has risen above personal aggrandizement. To the latter class belongs Vesalius. Restive under venerable restraint he dared to express his honest thoughts. He was an observer of the highest order. He believed in evidence and was willing to stand behind what his senses demonstrated. He found anatomy a superstition, he left it a rational science. His work paved the way for Highmore, Glisson, Wharton, Malpigii, Peyer, Meibom and Billini, names familiar to every student of anatomy.

Vesalius died long before he was appreciated, but in life he won this victory—the supreme satisfaction which only the search for truth can bring.

PARÉ AND SURGERY

PARE AND SURGERY

THE Science of Surgery may be traced back to a remote antiquity. The early Egyptians were familiar with the treatment of wounds and were expert in applying the roller bandage, their proficiency in this art being exemplified by the bandages seen upon the bodies of the Egyptian mummies. These bandages, many of which were placed in position over three thousand years ago, still bear evidence of the original exquisite neatness with which they were applied.

Early in her history Egypt had a knowledge of general surgery. Her surgeons were performing both the perineal and suprapubic operations for stone in the bladder during the third dynasty. We obtain this fact from the Ebers Papyrus, and from the same document we learn that these people were familiar with the reduction of luxations, that they trephined the skull and set and splinted broken bones. Further evidence of their surgical skill comes from the walls of ancient Thebes which

bear sculptured evidences of the surgical appliances of that day, depicting the instruments used in their operations and the technique then in vogue. The Egyptians operated for cataract and pterygium and were skilled in eye operations of a more minor nature. A number of instruments used by Egyptian opthalmologists are on exhibition in the British Museum. Among these is an epilation forcep and a horn spatula identical with those used by modern opthalmologists in the operation for entropion.

The Babylonians, according to Herodotus, who extols the surgical skill of their priests, had made much progress in surgery as far back as the second century before Christ. A clay tablet from the Royal Library at Nineveh containing the account of the healings by surgery of Izdubar, the founder of the United Babylonian Empire, seems to lend some dignity to this claim of the great historian. To indicate further the careful knowledge in surgery possessed by the Babylonians we find in the writings of Hammurabi the suggestion that surgical instruments should be cleaned before they are used. It is interesting to recall that

no further mention is made of this important technique till Lister emphasized the necessity for it centuries afterward.

In the fifth century before Christ Democrates supplied another interesting fact now recognized by modern surgery, by teaching that small living particles were the cause of disease, thus anticipating Pasteur about twenty-four hundred years. These two instances of old ideas being reborn give a modern emphasis to the wisdom of the sage who proclaimed that under the sun there was nothing new.

India seems to have attained a high degree of surgical skill at an early date in her history. A commentary on the work of Sashruta explains the various steps necessary in performing an operation for hysterectomy and gives the technique employed in opening the abdomen. Surgery later was put under the ban of the Brahmanic casts in India and declined so rapidly that in the seventh century, though we find a chain of hospitals reaching across the country, no surgery was performed, the hospitals being given over to the treatment of the poor and the care of the sick and helpless animals.

Ambrose Paré has been called the father of modern surgery. He lived at the time when the wheels of progress that had spun steadily backward for many hundred years had only begun to reverse themselves. Paré had as a foundation for his science, an erroneous anatomy, a physiology of pure fiction, a chemistry made up of absurdities and just enough knowledge of surgery to act as a handicap. During the most active part of his career "De Fabrica Humani Corporis" of Vesalius was in its making. Paré's anatomy, it will be seen then, was the anatomy of Galen. He believed that there was a porous wall between the ventricles of the heart through which the blood circulated, that the sternum was composed of six bones, that the ascending vena cava had its origin in the liver, that the skin was supplied by muscles and that the human heart was provided with a small "imputrecible" bone.

Paré's physiology was also the physiology of Galen. Galen taught that life, both physical and mental was controlled by four elements. These elements were spoken of as humors and consisted of yellow bile, black bile, blood and phlegm. They were again subdivided into hot and cold and dry

and moist. By these elements a person's characteristics and disposition were formed. An echo of this belief is found in our own language, hence we speak of a high tempered person as hot blooded and of a cruel person as cold blooded. One with a good disposition is good humored and the opposite is bad humored. Yellow bile causes one to be dull or choleric, good blood makes him hopeful or sanguine and too much phlegm leads him to be phlegmatic. Our phrases goodhearted, hardhearted, heartsick and tenderhearted have their origin in the physiology of Galen.

Physiology during Paré's time was greatly influenced by the teaching ascribed to the mythical Physiologis. These teachings were widely studied under the caption of "Beasteries, or the Book of Beasts." With much gravity these treatises describe why it was that the lion sleeps with its eyes open, why the elephant cannot lie down, how the pelican is able to bring her young back to life by sprinkling them with her own blood, and the reason why the crocodile weeps after he has eaten a man. These writings so affected medieval thought that they supplied the imagery which gave origin to the animal heads seen on antique furniture,

animal appendages on ancient European churches, and grotesque embellishments of medieval architecture generally.

Ambrose Paré was born in Bourg-Hersent, France in fifteen hundred and ten, the son of a common servant, though to chronicle this fact is irrelevant. No one is born great. One may be born with characteristics which lead to greatness, but these have to be developed by the individual himself. Who saw greatness in Lincoln in his homespun pinafores or in Garfield sleeping upon a corn shuck mattress? Their greatness came only after they had transformed their natural characteristics into character. Paré lived to revolutionize surgery and to place it upon a scientific foundation; to transform it from a shameful occupation to a respectable science; and incidentally to hew out a place for himself among the great.

Paré did not have the advantage of an early education. Whether he gained or lost by this will always remain a matter of opinion. A certain amount of mental discipline, we believe, is good for the youthful mind but if we take Humboldt seriously we will conclude that more than one year in a University will "constrict rather than expand

the intellect." Many pebbles have been polished by a college curriculm. Of this there can be no doubt, but what of the diamonds that have lost their luster by the same process?

Paré's schooling was given him at the hands of kind old Nature. As a boy he knew the habits of all the birds in his community, was acquainted with the plants and flowers of the adjacent country and stored up many things regarding these in his mental granary. In thus developing his powers of observation he was learning to appreciate first hand knowledge. Without this gift he would never have been known to us.

Paré placed his foot on the first step of the ladder of fame in the capacity of the village barber, and while shaving chins he also did the surgery that came his way. Popular superstition had long since made of surgery a despised calling. The physicians of the time dealt with the treatment of wounds only. Aside from the practice of phlebotomy they abhorred the shedding of blood and despised those who practiced any form of operative surgery. Naturally the practice fell into the hands of the lowly and the unlearned. Wilder tells us that "till the time of John Hunter sur-

gical practitioners consisted generally of barbers, furriers and even cobblers and tinkers." Usually, however, surgery was the prerogative of barbers, then an ignorant and despised class, and those practicing it were known as barber surgeons. This was Paré's status in society in his native village.

In fifteen hundred thirty-three the plague was raging in Paris and buboes innumerable were waiting the magic touch of the razor. In a little while Paré was on the ground, carried there, no doubt, by the same enthusiasm and devotion to his work which was to make his name immortal. We hear nothing more from him till the epidemic subsided at which time we find him a dresser of wounds at Hotel Dieu. In this capacity he served several years during which time, not being content with the surgery as practiced by his colleagues, he made application to Sylvius for a course in anatomy and was duly installed as a member of his classes. To take a barber under his pedagogic wing was an innovation with Sylvius and was brought about, it is thought, through the influence of some person now unknown. Probably the name of Paré's benefactor was withheld in order to es-

cape reproach, and incidentally to lose a place in history.

Paré's work at Hotel Dieu created for him an acknowledged reputation and when Francis I invaded Piedmont he accompanied the army as a surgeon. Surgery at this time was crude and cruel in the extreme. Anæsthesia, of course, was unknown. Patients to be operated upon were bound upon a table and the surgeon proceeded with no regard for the cries and screams of the victim. Boiling oil, used without mercy, was the principle surgical dressing. Spurting vessels were closed by being seared with a red hot iron instead of with the ligature. The more courageous patients held bullets between their teeth and allowed the surgeon to proceed while the more timid, rather than submit to surgical operations, often chose death by suicide.

Green vitriol stood next in popularity to boiling oil as a surgical dressing and its use, at that time, suggests the faith cures of the present day. John Cordo Jefferson states that this treatment was used in England as late as the seventeenth century. "Good for many things" he writes, "it was especially efficacious for the cure of wounds. If a

piece of a wounded man's raiment, stained with blood from the wound, were dipped in water holding some of this miraculous powder in solution, the wound of the injured person forthwith began to heal. It mattered not how long a time had elapsed since the infliction of the wound or how far the sufferer was away from the place when the bit of blood-stained raiment was placed in the sympathetic solution. The patient might be dying in Paris or Madrid, and the piece of stained velvet or linen might be operated on in London."

After the close of one of the bloody battles of this campaign the young surgeon Paré found, to his dismay, that the supply of boiling oil and the green vitriol had run short while there were still many wounds to be dressed. The story of how he substituted a simple ointment during this emergency and, finding this method superior to the established treatment, succeeded in introducing it into the French army, thus revolutionizing the treatment of gunshot wounds, is well known.

Paré's next innovation was the use of the ligature as a means of checking hemorrhage from large arteries during amputations. Previous to this time, as already mentioned, bleeding vessels

were seared with hot irons. Other innovations followed in rapid succession. He was the first surgeon to use the suture in hair lip, the first to employ successfully the truss in hernia and the first to amputate at the elbow joint. He introduced the practice of massage, made artificial eyes from silver and originated a method for re-implanting teeth. He described fractures of the neck of the femur and treated these fractures by extension. He described the advantage of podalic version in obstetrics and discovered the part played by syphilis in the establishment of aneurism.

Paré was continuously with the army, in time of war, during a period of thirty years. In the intervals of peace he lived in Paris where he served as surgeon to the French Kings Henri I, Francis II, Charles IX, and Henri III. Between his army campaigns he wrote voluminously, his principle works being "Journeys in Diverse Places," "An Essay on Gunshot wounds," "A Discourse on Podalic Version" and "A Treatise on the Unicorn." In this latter work he attacked the then popular superstition in reference to this fabled animal. Filings from the Unicorn's horn had long been a favorite remedy with medieval

physicians, which fact illustrates the charlatanry associated with early medicine, for this supposed quadruped with a gigantic horn on its nose, in reality never did exist. Paré's essay, however, failed to at once banish the superstition, for we find Sir Thomas Browne of England combating the "Insufferable Delusion" in his "Religio Medico" written fifty-three years after Paré's treatise was published.

Paré was the first man of his century to enter a protest against indiscriminate bleeding. "When in doubt, out with your lancet" was then a familiar maxim. The written works of the medieval and later surgeons indicate the extent to which this practice was carried during, and long after, the middle ages. Guy Patin, Dean of the Paris Faculty in the 17th century described the surgeons of his time as "A race of evil, extravagant coxcombs, who wore mustaches and flourished razors." From his writings it may be supposed he was conservative for his time, yet we find him bleeding his wife twelve times for a "fluxion in the chest," his son twenty times for a continued fever, himself seven times for a cold in the head, while his friends, M. Mantel and M. Consino bled

thirty-six times and sixty-four times in a fever and a rheumatism respectively. Sir Edmond King received a thousand pounds for bleeding Charles Second "with the courageous promptitude that prolonged the King's life for a few days." And when we remember that the good king had been bled by twelve other surgeons previous to this these words from the record "And so he died" do not appear to indicate a very marvelous termination.

The following verses from the pen of a phlebotomist extol the virtue of his art:

"Of bleeding many profits grow, and great,
The spirits and the senses are renewed thereby,
Tho these men slowly by the strength of mate
But these by wine restored are bye and bye:
By bleeding to the marrow cometh health.
It maketh clene your brane, releeves your eie,
It mendeth appetite, restoreth sleepe,
Correcting humors, that do waking keepe
All inward parts, and senses also clearing.
It mends the voice, the smell, the hearing.

Paré emphasized the fact that the meddling surgeons, appearing at the time when nature

was making her greatest fight, when every ounce of blood was needed, instead of doing good, drove the patient into physical bankruptcy.

In keeping with the spirit of the time, Paré met with vituperation on every hand. His colleagues denounced him for the use of the ligature, which they characterized as "hanging the life of a man on a string" when red hot irons were always available, and for blinding himself to the virtue of boiling oil as a surgical dressing. Medical men also took a hand against him and were particularly bitter because of his ridiculing their popular remedies. Notwithstanding the enmity of the profession he retained his position in Royal Circles and was a popular hero with the army till the last. He died in fifteen hundred and ninety, a peaceful and natural death.

BALAVIGNUS AND SANITATION

BALAVIGNUS AND SANITATION

THE most cursory student of history will find the footprints of the Jew everywhere along the paths of progress. In all departments of human endeavor he has cut deep his niche and he has accomplished this in the face of oppression, persecution, and ostracism. He has lived under constant suspicion; he has been buffeted, despoiled and spurned: but through it all has preserved an optimism inimitable.

In medieval times the Jew of Europe was confined within the limits of a ghetto. This compliment, a recognition of his superiority and an expedient to block his progress, was instituted by his gentile neighbors who realized that they could not compete with him. Ghetto life was accepted by the Jew uncomplainingly. In many ways he believed that it was to his advantage. It hindered amalgamation with other peoples, and prevented him from losing his identity. It preserved for him his racial ancestry, a lineage traced from Ar-

phaxed tribes, far beyond the days when the tents of Abraham were pitched on the right bank of the Euphrates.

It is not strange that the Jew has regarded his ancestry as a priceless heritage. The Jews were preparing for future generations their sublimest literature and were formulating one of the world's grandest systems of ethics at a time when their future persecutors were living in brutal savagery. Jewish minds were framing the laws which are the present basis of human justice, the fundamental ground work of all civilized law, when the tribes now Christian governed only by brute force. Rules of sanitation, to this day little improved upon, were originated by the Jew when roving bands, the progenitors of present European races, were living in dens and caves little better than those of the wild animals whose flesh served them with food.

The Jew has retained his racial pride only through a recognition of this uniqueness of his ancestry. It has given him courage indomitable and because of it Jewish progress has swept irresistibly forward. Stubborn prejudice has builded many barricades to impede his advance-

ment, but with an unbounded optimism the Jew looks forward to the day when these impediments will be scaled, and under the guidance of the Lord of Hosts justice for all will triumph.

. . . . . .

In the early part of the fourteenth century at Thenon, near Strasburg, lived the Jewish physician Balavignus. Though distinguished among his people, it is known that his life was confined to narrow limits and that his services were not in demand except by his own race. In medieval Europe the Jew, if not bearing upon his person a concession, went beyond the limits of the ghetto at his peril. Occasionally the monotony of ghetto life was broken to the Jew of commerce. His financial aid and his advice in matters of commerce were often sought. To the commercial Jew, however, was extended a prerogative which never fell to the Jewish physician. Gentiles were forbidden to employ him as a medical practitioner and severe penalties were imposed upon the Jewish physician who was found a party to the infringement of this law.

For the part he was to play in saving his people from the devastations of a great epidemic, fate early made of Balavignus a student of Arabian sanitation, a science unfamiliar to the gentile physicians of his time. Sanitary science, almost modern in principle, was brought into Moslem Europe by the Mohammedan conquerors. In some of the cities of Spain may still be seen the street paving, and other evidences of sanitation, put there by the Moors at a time when London was reeking with filth and Paris threw her refuse into the gutters. Many of the greatest physicians under Moslem rule were Jews. Among these was the renowned Maimonides of Cordova whose work "Tractatus de Regimine Sanitatus" written over seven hundred years ago is still a classic.

Balavignus was also a master of Jewish tradition and was in a position to apply literally the principles of Pentateuchal sanitation. These writings of Moses contain the most practical instructions in reference to disinfection as well as

NOTE. For a most striking discussion of the oppression of medieval Jewish medicine and the penalties which were imposed on the gentiles employing Jewish physicians refer to "History of the Jews" by Graetz.

the incineration of refuse. In the laws of health laid down in Leviticus we have the fundamental basis of modern sanitary science. Moses ordered that cases of leprosy should be segregated, that dwellings from which infected Jews had gone should be inspected before again being occupied, and that persons recovering from contagious disease were not to be allowed to go abroad until examined. The modern quarantine harks back to these sanitary regulations of the old Bible.

Besides being familiar with the Pentateuch in the original, Balavignus was also a student of the Talmud, and Talmudic writings contain a great mass of medical information, setting forth scientific facts antedating many supposed modern discoveries several hundred years. The Talmud shows the Jews to have been far in advance in their time in anatomy. Dissections of the human body had been performed and the results had been carefully noted. They had a passing familiarity with surgery for they operated for stone in the bladder, inserted artificial teeth, and even performed the Cæsarian section. That they were possessed with a thoughtful and progressive medical spirit is indicated by Talmudic writings

which describe rabies and pleurisy, and mention jaundice and gives its pathology as bile in the blood. These studies so shaped the career of the great sanitarian that the ghettos under his supervision were entirely free from the filthiness so general throughout Europe.

In thirteen hundred and forty-six the plague broke out in various places in Europe. In a year's time it had reached Strasburg where it swept away the inhabitants by thousands. Many were struck as if by lightning and died in the streets. Thousands took flight and expired in the roads outside the city. Others walled themselves up in their homes and either died of the disease or starved to death. Grass grew everywhere in the streets. Great vats were dug and to these thousands of corpses were hauled at night and thrown in. An ominous silence reigning everywhere was broken only by an occasional wail of distress or the rumbling of carts laden with corpses.

Bocaccio says that "amid this general lamentation and woe, the influence and authority of every law, human and divine, vanished. Most of those who were in office, had been carried off by the

plague, or lay sick or had lost so many members of their families, that they were unable to attend to their duties; so that henceforth everyone acted as they thought proper. Others, in their mode of living, chose a middle course. They ate and drank what they pleased, and walked abroad carrying odoriferous flowers, herbs or spices, which they smelt at from time to time, in order to invigorate the brain, and to avert the baneful influence of the air, infected by the sick, and by the innumerable corpses of those who had died of the plague. Others carried their precaution still further, and thought the surest way to escape death was by flight. They therefore left the city; women as well as men abandoning their dwellings, and their relations, and retiring into the country. But of those, also, many were carried off, most of them alone and deserted by all the world, themselves having previously set the example. Thus it was, that one citizen fled from another—a neighbor from his neighbors—a relation from his relations; and in the end, so completely had terror extinguished every kindlier feeling that the brother forsook the brother—the sister—the wife, her hus-

band; and at last, even the parent, deserted his own offspring, and abandoned them, unvisited and unsoothed, to their fate."

By the Christians the plague was considered a visitation of Providence and was allowed to run its deadly course unchecked by sanitary measures. Sewerage at this time was a thing unknown among the gentiles. The people were crowded together and refuse was thrown in the streets. The example of a great number of consecrated men, living in sack cloth and ashes, was emulated by the poorer classes whose dwellings were unspeakably filthy. Erasmus tells us that at this time the floors of gentile homes were made of rushes and were strewn unmolested with an ancient collection of "beer, grease, fragments and everything nasty." The plague being carried by rats no condition could have been more productive of its spread than was afforded by this general uncleanliness.

Balavignus insisted that no better setting for an epidemic could be staged than was accorded by

NOTE. For an account of the general filthiness and lack of sanitation of medieval Europe refer to "History of European Morals" by Lecky.

the general lack of sanitation which was to be found in the homes and premises of his neighbors, both Jewish and Christian. Immediately following the advent of the epidemic, he instituted a clean up movement among his people. In this campaign to promote general cleanliness it cannot be presumed that Balavignus had the modern conception of the etiology of the disease, but it is an undisputed fact that he sensed in some way the relation between dirt and disease and attributed the plague to filth. How much more advanced were his ideas than those of the European gentile physicians is indicated by the following extracts from a report of the College of Physicians of Paris, an institution which excluded the Jew and whose members frowned upon the idea that he could be anything but a charlatan.

"We, the Members of the College of Physicians, of Paris, have, after mature consideration and consultation on the present mortality, collected the advice of our old masters in the art, and intend to make known the cause of this pestilence more clearly than could be done according to the rules and principles of astrology and natural science, we therefore, declare as follows:

It is known that in India, and the vicinity of the Great Sea, the constellations which combated the rays of the sun, and the warmth of the heavenly fire, exerted their power especially against that sea, and struggled violently with its waters.

"We are of the opinion, that the constellations with the aid of nature, strive, by virtue of their divine might, to protect and heal the human race: and to this end, in union with the rays of the sun acting through the power of fire, endeavor to break through the mist. Accordingly, within the next ten days, and until the 17th of the ensuing month of July, this mist will be converted into a stinking deleterious rain, whereby the air will be much purified. Now, as soon as this rain shall announce itself, by thunder or hail, every one of you should protect himself from the air; and, as well before as after the rain, kindle a large fire of vines, green laurel, or other green wood; wormwood and chamoile should also be burnt in great quantity in the market-places, in other densely inhabited localities, and in the houses. Until the earth is again completely dry, and for three days afterward, no one ought to go abroad in the fields. During this time the diet should be simple, and people

should be cautious in avoiding exposure in the cool of the morning. Rain-water must not be employed in cooking, and everyone should guard against exposure to wet weather. If it rain, a little fine treacle should be taken after dinner. Fat people should not sit in the sunshine."

Compare these conclusions with the ideas of Balavignus.

Following the sanitary laws as set down in Leviticus Balavignus had all refuse burned. Naturally the rats left the ghettos and gravitated to gentile quarters in search of food. The Jews consequently suffered less from the disease than did their Christian neighbors, the mortality in the ghettos being five per cent. of what it was among the Christians. This was so noticeable that the Jews at once fell under suspicion. It was observed that they covered their wells and took away their buckets. This led to the belief that they were not only escaping the plague themselves but were in a conspiracy to destroy the Christians by the disease. One day it was said that some one had seen a Jew deposit a bag containing poison in a well. This report so infuriated the people that a general massacre of the

Jews was begun. Hecker tells us that "In this terrible year an unbridled spirit of fanaticism and thirst for blood caused the death of nearly all the Jewish population in Strasburg. Torture was always inflicted upon the victims before they were thrown into the flames. At Eslengen the whole Jewish community in despair burned themselves in the synagogue. Mothers were seen to throw their children on the pyre and then precipitate themselves into the flames." A visitor to Strasburg to-day may see there a monument erected to commemorate the death of over two thousand Jews who fell victims at the hands of fanaticism during this fatal year.

Balavignus early fell under suspicion of being the one man of his race capable of producing the poison which was thought to be responsible for the disease. Dazed and driven insane by excruciating tortures he made a confession implicating other Jews and a number of Christians. Thousands upon thousands during these dark ages made similiar confessions accusing themselves of the most absurd and impossible acts simply as a means of bringing their torture to an end. The vicious spirit which made confession inevitable also

brought about conviction and Balavignus was condemned. The same night in the court-yard of his prison a sentence was read, the faggots crackled, the mob chanted, "Justice shall prevail," and soon in the smoking embers lay the mortal remains of one who, had his advice been heeded, would have proved to be one of the world's greatest benefactors.

In examining the following quotations from documents written by the Scribe of the Court to the Mayor of Strasburg it is difficult for us, to-day, to understand the psychology of this sort of "justice."

"Answer from the Castellan of Chillon to the City of Strasburg, together with a copy of the inquisition and confession of several Jews confined in the Castle of Chillon on suspicion of poisoning. Anno 1348."

"To the Honorable Mayor, Senate, and Citizens of the City of Strasburg, the Castellan of Chillon, Deputy of the Bailiff of Chablais, sendeth greeting with all due submission and respect.

"Understanding that you desire to be made acquainted with the confession of the Jews, and the proofs brought forward against them, I certify,

by these presents, to you, and each of you that desire to be informed, that they of Berne have had a copy of the inquisition of the Jews who lately resided in the places specified, and who were accused of putting poison into the wells and several other places; as also the most conclusive evidence of the truth of the charge preferred against them. Many Jews were put to the question, others being excused from it, because they confessed, and were brought to trial and burnt. Several Christians, also, who had poison given them by the Jews for the purpose of destroying the Christians, were put on the wheel and tortured. This burning of the Jews and torturing of the said Christians took place in many parts of the country of Savoy.

"Fare you well."

"The confession made on the fifteenth day of September in the year of our Lord 1348, in the Castle of Chillon, by the Jews arrested in Neustadt, on the charge of poisoning the wells, springs, and other places; also food, etc., with the design of destroying and exterminating all Christians."

Balavignus, a Jewish physician, was arrested at

Chilton in consequence of being found in the neighborhood. He was put to the rack, and on being taken down, confessed, after much hesitation, that about ten weeks before, the Rabbi Jacob, of Toledo, who, because of a citation, had resided at Chamberi since Easter, sent him, by a Jewish boy, some poison in the mummy of an egg; it was a powder sewed up in a thin leathern pouch, accompanied by a letter, commanding him on penalty of excommunication, and by his required obedience to the law to throw this poison into the larger and more frequented wells of the town of Thenon, to poison those who drew water there.

He, Balavignus, confessed that about two months previously being at Evian, he had some conversation on the subject with a Jew called Jacob, and among other things, asked him whether he also had received writings and poison, and was answered in the affirmative; he then questioned him whether he had obeyed the command, and Jacob replied that he had not, but had given the poison to Savetus a Jew, who had thrown it into the well de Morrer at Evian. Jacob also desired him, Balavignus, to execute the command imposed on him with due caution. He confessed that Aque-

tus of Montreantz had informed him that he had thrown some of the poison into the well above Tour, the water of which he sometimes drank. He confessed that Samolet had told him that he had laid the poison, which he had received, in a well, which, however, he refused to name him. Balavignus, as a physician further deposed that a person infected by such poison coming in contact with another while in the state of perspiration, infection would be the almost inevitable result; as might also happen from the breath of an infected person. This fact he believed to be correct, and he was confirmed in his opinion by the attestation of many experienced physicians.

Balavignus, in conclusion, attests the truth of all and everything as above related. He believes this poison to contain a portion of the basilisk, because he had heard, and felt assured, that the above poison could not be prepared without it.

The above named Jews, prior to their execution, solemnly swore by their law to the truth of their several depositions, and declared that all Jews whatsoever, from seven years old and upward, could not be exempted from the charge of guilt,

as all of them were acquainted with the plot, and more or less participators in the crime.

I must add that all the Jews of Neustadt were burnt according to the just sentence of the law.

Certain commissioners have been appointed by the magistrates to enforce judgment against all the Jews; and I believe that none will escape."

It remained for a Bavarian Jew, John Peter Frank, to open wide the trail toward sanitation blazed by Balavignus. His great work on Public Hygiene "A Complete System of Medical Polity" giving plans for correct sewerage and water supply and a life spent in arduous study and teaching were the means of greatly minimizing the great epidemics of Europe.

Sanitation has now practically abolished the plagues from the world. Cholera is becoming a thing of the past, typhus is no longer a deadly menace and even typhoid is rapidly on the wane.

In extending our gratitude to those who have

NOTE. An account of the trial of Balavignus and other Jews of Strasburg, their torture and execution, together with copies of the documents of the Prosecuting Court is contained in "The Black Death" by J. F. C. Hecker.

made these results possible let us not forget a great man of science, the gentle and humble Balavignus.

PARACELSUS AND RATIONAL THERAPEUTICS

PARACELSUS AND RATIONAL THERAPEUTICS

UNTIL a comparatively recent date medical science was an outcast. During the middle ages the rational therapeutics of Greece and Rome gave way to charms, amulets, talismans and various and sundry substances devoid of therapeutic properties. The following prescription from "A Short Manual of Physic" published in the seventeenth century by Dr. William Solomon of London is a good example of the therapy of its period.

"Recipe. Gold, one half ounce, Powder of a lion's heart, four ounces. Filings of a unicorn's horn, one half ounce, ashes of the whole chameleon, one and a half ounces. Bark of witch-hazel, two handfulls. Earth worms a score. Dried man's brain, five ounces. Bruisewort and Egyptian onions of each one half pound. Mix the ingredients together and digest in my Spirits Universalis, with a warm digestion, from the change

of the moon to the full, and pass through a fine strain."

Another prescription by Dr. William Pullyem one of the most eminent English authors during the reign of Edward Sixth suggests the prevailing trend of therapeutic thought. This preparation which he styles "Electuarium de Jemini" is prepared as follows:

"Take two drachms of white perles; two little pieces of saphyre; jacinth, corneline, emerauldes, garnettes, of each an ounce; setwal, the sweate roote doronike, the rind of pomecitron, mace, basel seeds, of each two drachms; roots both of white and red behen ginger, long pepper, spicknard, folium indicum, saffron, cardamon of each drachm; cinnamon galinga, zurubeth, which is a kind of setwal, of each one drachm and a half; thin pieces of gold and silver, of each half a scruple; of musk, half a drachm. Make your electuary with honey emblici, which is the fourth kind of mirobolans with roses, strained in equall partes, as much as will suffice. This healeth cold, diseases of ye brain, harte and stomache. It is a medicine proved against the tremblynge of the harte, faynting and souning, the weaknes of the stomacke,

pensivenes and solitarines. Kings and noble men have used this for their comfort. It causeth them to be bold spirited, the body to smell wel, and ingendreth to the face a good coloure."

As seen from the foregoing, precious stones were supposed to have a particular virtue in healing disease. These were often taken internally. By those not able to afford such costly medication they were procured for a monthly stipend to be worn about the person. We find an echo of this superstition in the modern watch-charm. Literature abounds with reference to charms of many kinds which were worn for their supposed therepeutic value. Scott in his "Talisman" mentions the healing effect of heliotrope or bloodstone which "stancheth blood, driveth away poison, preserveth health; Yea, and some maintain that it provoketh rain and darkeneth the sun, suffering not him that beareth it to be abused." We read further that "The topaz healeth a lunatic person of his passion of lunacy and the garnet assisteth sorrow and recreates the heart." From the same authors "Lay of the last Minstrel" we find mention of the charm being used as a hemostatic in these lines "She drew the splinter from the wound and with a charm she

stanched the blood." Charms were used for the cure of malaria and small-pox and to assist in the union of broken bones. The color of the charm was believed to have a direct bearing upon the disease. It was thought that flannel dipped nine times in blue dye was a cure for scrofula. Spiders hung around the neck were said to be specific in malaria and we have it on the authority of an English physician of the seventeenth century that this method of treatment, when applied to ague fits "will drive them away God be thanked."

"Cured by a spider hung around one's neck in a nut shell," lines from Longfellow's "Evangeline" have reference to this superstition regarding the cure of disease. In the National Museum at Washington may be seen an interesting exhibit of charms which have been used in the past, and are still used by some, to ward off diseases. Among this incongruous array several specimens are seen which remind one that folk medicine still exists among us. Here are the rabbit's foot, the horse chestnut, the patella of the sheep, and rings made from a coffin nail. Many primitive people in this country still cling to the idea that curative virtues

are in some way bound up in these amulets. Everyone, perhaps, is familiar with the madstone for the cure of hydrophobia. This stone was originally used as an amulet. Some charms were made of herbs and roots. We find the remains of this superstition in the Irish potato carried in the pocket to cure rheumatism, in the asafœtida worn about the child's neck to prevent contagion and in the string of roots which, even to-day, primitive minded mothers place about their babies' necks to facilitate the process of dentition.

The belief that scrofula could be cured by the touch of Royalty was common as indicated by the following words put by Shakespeare into the mouth of Malcolm: "'Tis called the Evil, a most miraculous work in this good King: Which often since my here remain in England, I have seen him do. How he solicits heaven, himself best knows; But strange visited people, all swollen and ulcerous, pitiful to the eye, the mere despair of surgery, he cures--Hanging a golden

NOTE. For a description of the development of fetich cures of the dark ages refer to "A History of Medicine" by Garrison.

lamp about their necks, put on with holy prayers; And 'tis spoken, to the succeeding Royalty he leaves the healing benediction."

The credulity of the times caused even medical men to accept prevailing delusions with implicit confidence. Climbing out of a mental rut is a painful process.

. . . . . .

Two great events occurred in the last decade of the fifteenth century: America was discovered and at Marie Einsiedeln, in Switzerland, a child was born. This child was to go through the world burdened with the name Aureolus Theophrastus Bombastus Von Hohenheim or Paracelsus. It was also decreed that he was to live a life of turmoil, was to go down in defeat and that three hundred years afterward his works were to be re-

NOTE. For a recitation of supposed miraculous cures brought about by the Royal touch and other therapeutic absurdities, together with a number of ultra-ludicrous prescriptions current in Europe during the renaissance refer to "The Healing Art" by Adams, London, eighteen hundred and seventy-seven.

vived and used as a means of sounding the death knell to a medical stagnation that had hung over Europe since the time of Galen.

The father of Paracelsus was a physician and his mother a hospital superintendent. This explains his reason for saying "from my swaddlings I have understood disease." It is well that he had this early training. Children's minds are impressionable. They catch the ideas of others and after a time these ideas become fixed upon the sensitive plates of their minds, and without any effort upon their part, are stored away for future reference.

At a very early age Paracelsus was recognized as a precocious child and before his fifteenth year he had picked up an unusual amount of medical knowledge mixed with prevailing ideas of alchemy, astrology, and the occult. At nineteen years of age he was studying chemistry with Abbott Tritheim, a Benedictine monk. A little later he is in the laboratory of Sigismund Fugger in the Tyrol where he studied the relation of chemistry to metallurgy. During the next few years he wandered about in France, Italy and Germany visiting one university after another but not remaining long enough in any to obtain a degree.

Next we find him leading the life of a vagabond or wandering physician. In this capacity he travelled over Southern Europe and visited India and Egypt. He collected information as he went, associating with the physicians with whom he came in contact and, it is said, with bath-keepers, fortune tellers, barbers, hangmen and gypsies.

When accused of keeping low company he remarked that a gem was a gem whether found in a jewel case or in a garbage heap. For a time he held a commission as surgeon to the Imperial Army of Italy. Returning to Basel in fifteen hundred and twenty-seven he was appointed city physician and occupied the chair of medicine in the University.

Early in his career Paracelsus acquired the animosity of the profession by writing his prescription in German. This was an innovation which caused his contemporaries to charge him with ignorance and with the heresy of making medical mysteries known to the laity. The medical man of the sixteenth century wore a wig and a scarlet coat and carried a staff. This conventional dress Paracelsus discarded and, in doing so, fell under the contumely of vulgarizing the

profession. At the university Paracelsus taught his students in their own language, instead of in Latin, and again he was accused of cheapening medical knowledge. As a teacher in the University Paracelsus strove to throw off the ossified wisdom of his time and to supplant tradition with facts. As opposed to the conformists, he was ever ready to strike a blow at harmful traditions which had been handed down from antiquity. Such a man could not go long unnoticed at a time in which it was a crime to differ from current opinion. The desire to conform has ever been a weak point in human nature. Even to-day, let us remember, we shrink from having our conventional habits of thinking disturbed. In the past this human failing evidenced itself by an arrogant intolerance; an intolerance which presumed that all was known that could be known. The history of science is largely made up of innovations on the one hand and, on the other hand, attempts to crush every semblance of original thought. As an illustration of this we find in England, during the reign of Henry VIII, a law with the object of compelling all persons to think alike. It may still be seen in the musty archives of legal fossils and

is entitled "An Act for Abolishing Diversity of Opinion." This spirit of intolerance unmodified by centuries would have prevented Koch, Metchnikoff, Pasteur, Ehrlich and Wassermann from being blessings to humanity. Fortunately the world has moved on a little since the days of Paracelsus.

Conventional intolerance caused Paracelsus to be denounced as an imposter. Invective hurled at him might have crushed him early in his career had not a sturdy common sense caused him to overlook the disdain with which he was received. He had a happy vein of humor and this is an asset which always leads toward success. Instead of growing sour he ridiculed the pedantry of his opponents. His good natured jibes elicited the sympathy of the people and when the people are with a cause they carry it a long way forward; when they are against it, alas for that cause; its epitaph is written.

For his audacity in condemning the medical practice of his time, Paracelsus reaped the reward which has been the lot of the great majority of innovators. Soon his colleagues at the university were up in arms against him. Perhaps the worst

would not have come had he not found his students, despite his teaching, clinging to the moss grown ideas of Galen. One day, in a fit of disgust and anger, he collected all the works of the great author and burned them in the lecture hall. This indiscreet act freshened the animosity with which he was held by his opponents and, in addition to this, it awakened in the public mind a bitter antagonism toward him. The Canon of Lichtenfels, whom, it is said, he had restored to health by his treatment, taking advantage of the popular clamor, now accused him of sorcery. The City Council of Basel eagerly accepted this ecclesiastical indictment and Paracelsus was compelled to flee the city. Had he remained the results may well be imagined.

From Basel he went to Nürenberg but the malignancy of his enemies preceded him. Here he met with difficulty everywhere and worked under the contumely of being a charlatan. Giving way to his migratory disposition we find him during the next fifteen years at Munich, Regensburg, Augsburg, Mindelheim and finally in fifteen hundred forty-one in the Tyrol, where death put an end to his wandering.

Paracelsus lived at a time when originality led often to the rack, the scaffold, or to violent death. Whether he met the latter end or not is still a question of dispute. It was said by his enemies that he died from the result of carousal and dissipation but many years afterwards his remains were exhumed for re-burial and at this time a fracture was found in his skull. To this fracture his death has been attributed by many historians for it points strongly to the probability of a murder at the hands of his enemies. If this be true, his is but another name added to the long list of medical martyrs.

No manipulator of the pestle and mortar has ever created such a revolution in medical thought as did Paracelsus. He was the first man in centuries to relegate precedents to the past and to stand firmly on deductions drawn from reason and experience. Through his teachings he accomplished more for humanity than did any other physician of his period. Besides caring for a practice of such magnitude that he became famed throughout the world, he wrote five books on medicine and he gathered data for these works wholly from his own records. By introducing the use of

chemicals in medicine, by opposing the polypharmacy of his time and by demonstrating the restorative power of nature, when nature is not handicapped by promiscuous drugging, Paracelsus may be considered the father of rational therapeutics.

With the exception of Agrippa he was the first physician to condemn witchcraft. He was the first to describe cretinism and to give a true clinical picture of opthalmic goitre, and the first to describe phthisis, then known as miners' disease. He introduced iron, arsenic, lead and copper into European pharmacopeia and was the first to use mercury with beneficial results in syphilis. Despising the parrot-like repetitions of the old masters he awakened progress by holding up to derision absurdities which, for centuries, had posed as science. "Mother nature," he said, "is the internal physician who, if left alone, will attend unassisted to most of the bodies ills." Nature failed when the patient had the "Seed of Disease" and then only was medicine indicated.

By taking a positive stand against the wound treatment of his contemporaries Paracelsus was a reformer in surgical practice. At that time it was

thought necessary to infect a wound in order to promote its healing, hence the old term "laudable pus" and we may remember that "laudable pus" did not cease to be laudable until a half a century ago. Fresh wounds were to be let alone; only old and sluggish wounds were to be disturbed and that solely with the curette for the purpose of removing debris. Paracelsus washed his wounds with wine. This treatment was rational for wine contains about twenty per cent. of alcohol and alcohol is a disinfectant. It evaporates and leaves the wound dry with free adhesive surfaces. Especially true to nature and minute in every detail is the clinical picture of hospital gangrene in his book "Chirurgia Magna" a manual containing many important discoveries in surgery not to be renewed until the days of Lister.

Turbulent as was the life of Paracelsus he caught vivid glimpses of a profession idealized. "One of the most necessary requirements for a physician," he said, "is perfect purity and singleness of purpose. He should be free from ambition, vanity, envy, unchastity, pomposity, and self-conceit because these vices are the outcome of ignorance and are incompatible with the light of

Divine wisdom which should illuminate the mind of a physician."

Paracelsus is known in medical history as its greatest iconoclast and it must be said of the iconoclasts that they have stood erect in the face of all circumstances, have fearlessly stated what they have thought to be true and have been willing to abide by the consequences, preferring any end rather than the soul sickness of mental coercion. This characteristic has made them enemies to hurtful tradition but through it they have blessed the world.

Paracelsus was the first medical apostle of the school of observation and experience. "If you wish to be a true physician," he wrote, "you must be willing to do your own thinking and not merely employ the thoughts of others. What others teach you may be good enough to help you in your search for knowledge, but you should be able to think for yourself, and not cling to the coat-tail of any authority, no matter how high sounding the letter of the latter may be." The world still needs men of this type to clear up the debris of stagnant thought and to those of the past we owe a lasting debt of gratitude.

CORNELIUS AGRIPPA AND PSYCHIATRY

CORNELIUS AGRIPPA AND PSYCHIATRY

ONLY in recent years has man been able to banish a fear of the unseen which, for thousands of years, had kept him in perpetual torment. Everywhere about him, in the long ago, were disembodied spirits, evil, malicious and cunning. Invisible forms, lurking in every shadow, were ready to hurl at him some great and terrible misfortune. From the midst of the storm reached the outstretched hands of the denizens of the unseen world; and malignant spirits, bent upon his undoing, leered at him from the lightenings flash. Witches with burning eyes cast malevolent glances from the darkness as they swung through the air on unholy errands bent, and salamanders, wreathing and hissing in the flames set the sparks flying vehemently across his hearth.

Every calamity that had befallen friend or neighbor was believed to be the culmination of the malicious design of some abominable demon. It

was thought that life itself would soon have suffered a frightful termination but for the guardianship of the friendly spirits who waged a perpetual warfare against the innumerable monsters of the air.

Such beliefs were as real to the medieval mind as are the phantoms conjured up to-day by the imagination of the child. When we recall the visions which accompanied our childish nocturnal adventures, when every lurking shadow held a ghost or goblin, we can realize something of the paralyzing terror of these mental children of the past whose paths were so beset with the creatures of their imaginations. The existence of these apparitions was rarely doubted. A great fabric of evidence was at hand to prove the prevalence of such enemies of the human race. Hundreds of persons believed that they had met these demons face to face and thousands more were thought to have gone down to untimely deaths at their hands.

During certain phases of the moon these malevolent enemies of mankind were thought to be particularly hostile and at such times their frenzy could only be allayed by seizing upon a victim. The bodies of the seized then became the

habitats of these dreaded personalities and the resulting symptoms, which we now know to have been insanity, were but the reflected conduct of the evil one himself. We have an illustration of this tradition in the word "epilepsy" which we get from the Greek and which literally means seizing.

It was argued by medical men of the time that moonlight was a factor in producing disturbed mentality because it gave the demon sufficient light to pursue his nefarious work. An echo of this delusion comes down to us in our English word lunatic, a term used by the old masters of medicine to designate any mental departure from the normal. It was thought the moon also had the power of creating physical ills and its debilitating rays were often the cause of death. It was known that the moon influenced the tides and at the turning of the tide death often hovered over the sick bed. We have a reminder of this weird superstition in the case of Shakepeare's Falstaff.

During this period of human history physical disorders were nearly always attributed to spirits who had evaded the protecting sylphs and had forced an entrance into the body. Failing in life

to accomplish their ends it was believed that they often succeeded in getting control of the disembodied soul after death. To frighten away these unwelcome neighbors bells were rung at night fall. This was the origin of the curfew and, as suggested by Professor Henry Draper, the bells to-day given to children as toys had a medieval significance very different from the modern. At that time they were put into the child's hands not to afford him amusement but to act as a safeguard to his very life. If these childish beliefs had not been accompanied by act of supposed retribution the history of this time would be of interest to us to-day only as an amusing study in psychology. Instead of this it gives us the most appalling examples of cruelty known to the world.

As already noted, a common belief during the middle ages was that of demoniacal possession of the living. Many persons, it was thought, were in league with the devil, the arch enemy of mankind. Possessed persons were accused of making storms at sea, of being responsible for periods of drought, of causing hailstorms, of stunting the growth of children and of a thousand other impossible crimes. Because of this superstition

thousands upon thousands of men, women and children suffered the most excruciating tortures. They were suspended to ceilings by their thumbs, were famished in dungeons, stretched on the rack and broken on the wheel. Only in death which left them beyond the reach of their tormentors were they to find deliverance. So fearful was the torture which usually preceded the executions of these victims that a great many confessed themselves guilty of the most impossible deeds. Accused persons were known to have admitted that they had caused children to vomit crooked pins, that they had inhabited the bodies of wild animals at night and were enabled thereby to commit the most diabolical acts. Thousands confessed themselves guilty of witchcraft, knowing that such a confession meant death.

The psychology of these confessions has long been a subject of mystery. It is probable that they were made in the hope of a few minutes surcease from pain or as a means of ending an un-

NOTE. A description of the almost unbelievable cruelties practiced upon the insane in England and Scotland for the purpose of driving out demons from their diseased bodies is given in "History of Insanity in the British Isles" by Tuke.

bearable existence. Some, no doubt, confessed because the terror occasioned by being accused drove them insane. It is estimated by Samuel Laing that, during the eighth century, in Germany alone, over one hundred thousand persons suffered excruciating deaths for the crime of maintaining an alliance with the devil.

This popular delusion was of long life. Even as late as the seventeenth century we find Sir Matthew Hale of England condemning two women to be burned for witchcraft and every American school child recalls with horror the fate of a large number of innocent persons who were executed as witches on this side of the Atlantic. It is remarkable that humanity clung so long to these superstitions. The only solution for this lies in the fact that for centuries the world was governed by fear. With fear humanity stands still; it is courage alone which is responsible for human progress.

In the treatment of the mentally deranged, as

NOTE. An account of confessions of the most absurdly impossible crimes wrested from victims during the middle ages, by torture, is given in the Papers of the American Historical Association for 1891.

in all other things, we find the hand of evolution. By this process the execution of the insane gradually gave way to punishment without death. For centuries these poor unfortunates were starved, exorcised and seared with hot irons, under the belief that the demons would find their bodies such an uncomfortable abode that they would vacate the premises for a more agreeable residence. Gradually several of these methods of punishment gave way and were supplanted by a therapeutic method with which medical history abounds for centuries. This remedial agent was the whip. So great was the belief in its merit that until a century and a half ago it was dispensed to the great as well as the lowly. George III, during his attacks of dementia, was flogged on more than one occasion and as late as eighteen hundred and ten we find Sir Thomas Moore of England advocating the public flogging of lunatics, and yet Moore was considered a humanitarian and, even to-day, is spoken of as one of the greatest philanthropists of his time. Even Shakespeare countenanced the treatment, as indicated by one of his characters, who speaks of the lunatic as meriting a dark house and a whip. Gordonius

declared whipping a specific in cases of nervous irritability and he suggests "If the patient be young and disobedient flog him soundly and often." Rev. S. Baringould tells us of a German physician of the seventeenth century who suggested whipping on the theory that "it cleared the brain, stirred up the stagnating juices, circulated the blood and braced the nerves." Whipping the insane was really meant for compassion and was intended rather as a chastisement of the demon who dwelt within than as a punishment of the patient. Only through such harsh measures, it was thought, could the evil spirit be induced to vacate the bodies of the possessed.

Another method of dealing with victims diabolically possessed was "torture insomnia," the poor subjects of mental disorder being kept continuously awake. No form of treatment could so successfully have defeated its own end. Sleep is as necessary to the human body as food is. It is only while we sleep that brain repair goes on. During our waking hours something which may be called brain waste is stored up within us and if not eliminated by sleep will, of itself, destroy our reason. Is it a wonder that none recovered?

Even if mildly insane, the victim was chained to a stake in an upright position and all the devices of perverted ingenuity were used to keep him awake. The inevitable was the result. What would have been a temporary disorder under rational treatment became a hopeless disease.

. . . . . .

In fourteen hundred and eighty-six, a time when the rôle of infamy and horror so long directed toward the insane was at its climax, a child was born at Cologne who was to cross swords with the swarming myriads of ghouls and infesting spirits, and whose influence, sweeping down through the centuries, was to be the means of banishing them forever from the world. This child was Henry Cornelius Agrippa.

Agrippa was a favored son of Cologne. He lived at a time when the ninety and nine were born into feudalism, were illy nourished, half clothed and poorly housed serfs whose ceaseless toil went to maintain an aristocracy and to support a brutal military employed to keep them in

bondage. Agrippa, of the one per cent. which history is pleased to call noble ancestry, was destined to throw away his birthright in the hope of bringing to a close the orgies of superstition and inhumanity toward the insane which so long had cursed his country. He was further destined to grope his way alone through a maze of intolerance and ignorance, maligned, opposed and suspected and, as a friend of the oppressed, was to meet with persecution which was to end only in death.

Agrippa's accident of birth gave him the opportunity of a liberal education, which, by the way, in medieval times consisted largely in storing the mind with mistakes and studying in detail various and sundry events which had never happened. The universities turned out an insipid product taught to conform but whose thoughts followed the beaten path of convention. By some Agrippa is believed to have graduated from the University of Cologne. Others say that he was expelled. At any rate he carried away from his university a salutary ambition to hew out a name for himself. What appeared to be a channel to this end was soon open. The court of Emperor Maximilian I was in need of a secretary. He could fill the re-

quirements both from the standpoint of blood and education, so he applied and was duly installed; but his new post brought him only disillusionment and soon he left in disgust with the jealousy and frippery of court life. In fifteen hundred and nine he studied divinity at the university of Dole, in Burgundy, and later became its professor of Hebrew. Here his utterances against the popular belief in witchcraft made him enemies but he worked on, patiently and aggressively, ever ready to strike with his caustic pen wrongs which for centuries had been blighting humanity. Later he took up the study of medicine and received his degree in fifteen hundred and fifteen and then traveled in France and England.

In fifteen hundred and eighteen he became the Syndic at Metz. Here he was appalled at the treatment of the insane who were either confined in dismal and repulsive quarters or languished in the most wretched dungeons. Incurable cases wore an iron belt about their bodies, with a ring attached, through which ran an upright bar. They could sit and stand, but this unhappy contrivance prevented their lying down, and in this way they were doomed to spend their miserable

lives. The prisons for the insane had no drainage and no proper ventilation. Disinfection was unknown. Shut away from the sunlight, eating improper food and drinking contaminated water they soon sickened and died. Two or three years was the average life of an inmate.

Agrippa began to advocate the treatment of the insane along humane methods and sought to prove that the padded cell was more efficacious than the iron collar and chain then used on nearly all cases. Contending that the prevalent superstition, as applied to the insane, was fatal to even a moderately disturbed intellect and impatient at the credulity of his contemporaries and the cruelties which their ignorance awakened he resolved, at any cost, to hew a path through this jungle of popular superstition.

One day a demented old woman was dragged through the streets having been accused of witchcraft. Agrippa made an impassioned plea in her defense upholding the view that the supposed witches were really victims of disease of the brain and that they should be treated with mercy instead of abuse. The result of this innovation was inevitable; he was openly denounced by the medical pro-

fession, his friends forsook him and soon the mob was at his heels. Savan, the inquisitor of Metz, was preparing to bring him before the inquisition for disturbing a popular belief when he fled the city. To remain would have meant death at the stake, the inevitable fate of those of the time whose personalities were not lost in conformity, or whose characters were not submerged in submission to authority.

Agrippa was still essentially an aristocrat and in fifteen hundred and twenty-three, at Lyons, he was made court physician to Louis of Savoy, regent of France. But he was not long to enjoy peace. His enemies began their intrigues anew and he was repaid for his services by being banished. His compensation was withheld and he again found himself a penniless wanderer. In fifteen hundred and twenty-eight he is once more a court physician, to Margaret of Austria, ruler of the Netherlands at Antwerp. Here he wrote his book "On the Vanity of the Sciences." This work

NOTE. A graphic account of Agrippa's attempt to save an insane woman from torture, and the persecution which followed the effort, is given by Prof. Henry Morley in his biography published in London in 1856.

was a general condemnation of the medical science of the time in which the part played by the medical profession in promoting the witchcraft delusion and its resulting cruelty to the insane was set forth in scathing language. His ideas in reference to the subject of insanity, embodied in this book, may be considered the nucleus around which has grown the science of psychiatry.

Soon after the publication of Agrippa's work he was imprisoned in Brussels. After a year he was released and returned to Lyons where he was again thrown into prison. In the year fifteen hundred and thirty-five at Grenoble, France, the great humanitarian, with a broken heart and a body wasted with disease, passed into the beyond. Much prison life had done for him what he had given so much of his life to save others from.

In eighteen hundred and sixteen Pinel at the risk of his liberty instituted the reforms which Agrippa sought to bring about nearly three hundred years earlier. Pinel succeeded in striking off the chains of insane prisoners, in liberating them from close and musty cells and in placing them in humane surroundings. Thus was the dream of Agrippa to become a reality.

The subject of this sketch was the first man in history to strike a blow in favor of the persecuted insane. Since that time all advocates for reform in the treatment of the mentally diseased have but followed the footsteps of this great physician, humanitarian and searcher after truth.

JENNER AND VACCINATION AGAINST SMALL-POX

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CHINA has been called a land without a history. This is no small recommendation to the world for history, as we know it, has largely been carved out of oppression, conquest, brutality, and the suppression of human rights. China with her peaceful tendencies has had little of this, pandemonium within her limits nearly always having been an imported product, the result of the so-called refinement of the West. Even her national vice, the use of opium, was forced upon her by Christian England at the mouth of the cannon. And China, it is said, is still much in need of the influences of our civilization.

In China, according to Max Mueller we find a school of philosophy which existed when the Greek peninsula was a land of barbarians; a religion of love antedating any similar sentiment a

NOTE. For an account of the narcotization of China by Great Britain refer to The International Encyclopedia.

thousand years; and a system of medicine older than that of Egypt. For hundreds of years China eclipsed the world in commerce. Her caravans were found everywhere in Asia and even in Africa. Within the last thirty years a number of articles of Chinese make have been taken from the tombs of the Pharaohs. These were placed there over three thousand years ago.

The Chinese book Chu King, written twenty-three hundred and fifty-seven B.C. divides the year into three hundred and sixty-five and a quarter days, thus anticipating the Gregorian Calender by just thirty-nine hundred and thirty-nine years. In the year twenty-one hundred and fifty-nine B. C. the royal astronomers Hi and Ho were punished for failing to predict an eclipse. This demonstrates beyond question that a knowledge of astronomy existed among these people at a very early age.

We are in the habit of smiling at the preparations used by the Chinese in their pharmacology. Attention has been called to the official work of the celebrated Lee Tshin, which contains dried spiders, lizards, snakes, bugs, toads, and dragon's bones, but these came into use three thousand

years ago. The critics of Lee Tshin have overlooked the fact that from sixteen hundred and eighty to sixteen hundred and ninety the London pharmacopæas contained extracts of worms, dried vipers, oil of ants, compounds of live worms, frogs and crabs' eyes, moss scraped from a human skull, excreta and hair of animals, urine, and human perspiration, spiders' webs, wood-lice, snake skins and a long list of pulverized animal appendages such as hoofs, horns, nails and teeth. This amount of Western Progress in twenty-eight hundred years is certainly not sufficient to mark an epoch.

The Chinese doctor is held in derision by his western contemporaries, but it must be admitted that much of our knowledge relating to modern drugs has long been the property of the Chinese. Their pharmacopeia contains over four hundred remedial agents that are in use in Europe and America. From the Chinese the Western world has obtained much of its knowledge relating to the preparation of tinctures. It may also be noted that, aside from the Egyptians, the Chinese were the first to insert artificial teeth. They were also pioneers in the use of eye glasses for

reading. Another fact is irrefutable and is worthy of more than passing notices; The practice of inoculation for small-pox was current in China a thousand years before Europe became acquainted with it. Next we hear of it in India. When the Hindus became familiar with this method of inoculation against small-pox is unknown, but it was at a date sufficiently remote to permit reference being made of it in their sacred vedas. There can be no doubt that the Hindus obtain the knowledge of this practice from the Chinese. Later, inoculation was adopted by Turkey, where it is known to have been in use for centuries. But for the keen insight of an English woman the western world might not yet have heard of the practice.

In seventeen hundred and sixteen, Lady May Montague, wife of the British Ambassador to Turkey, became acquainted with the Turkish methods of inoculation. The success of the cases of small-pox thus treated seemed so complete in

NOTE. For a description of inoculation against small-pox as practiced by the Chinese, Hindoos and Turks and the means by which it was introduced into Europe refer to "A History of Medicine" by Nathan Smith Davis.

warding off the disease that she became convinced of its efficacy and is said to have submitted one of her children to the operation. Soon after this she returned to England and found an epidemic of small-pox raging there. One of her children, a little girl, who had not undergone inoculation in Turkey was now submitted to the operation by a Dr. Maitland who also inoculated his own child and is said to have been responsible for popularizing the practice in his section of England.

At this time small-pox was the world's greatest scourge. McCauley in his History of England says that "small-pox was then the most terrible of all the ministers of death. The havoc of the plague was far more rapid, but the plague visited our shores only once or twice within living memory; and the small-pox was always present, filling the church yards with corpses, tormenting with constant fears all whom it had not stricken, leaving on those whose lives were spared the hideous traces of its power, turning the babe into a changeling at which the mother shuddered, and making the eyes and the cheeks of the betrothed maiden objects of horror to the lover."

Except locally the new practice was slow in

finding favor because the virus used was taken from small-pox cases and each case treated was found to be a focus from which the disease could be transmitted to others. Each person inoculated became, in reality, a modified case of small-pox and as the mortality of these cases was found to be two per cent. or more the practice was soon vigorously condemned and its advocates ostracised. On this side of the Atlantic prejudice ran high against inoculation. Dr. Zabiel Boylston, of Boston who inoculated his own son as a demonstration of his belief in the new treatment, was forced to flee from Boston for a time, and upon his return was forbidden by the selectmen of the city to indulge further in the practice. The people of Boston became so infused with prejudice against the advocates of inoculation that the practice soon fell into disuse; stimulated, no doubt by an attempt to burn the house of the Cotton Mather who had preached a sermon in favor of inoculation.

While the inoculation controversy, somewhat abated, was going on in Europe and America, a freckled-faced boy was growing up in an obscure village in England. This boy was Edward Jenner, destined by Providence to revolutionize the practice of inoculation against small-pox and to make it one of the greatest blessings of the world. Jenner was born in seventeen hundred and forty-nine. His father was a minister and a life long friend of John Hunter, the great surgeon, physician, and natural philosopher.

Jenner's boyhood was spent in the village of Berkley in Gloucestershire, a typical English hamlet composed of a group of cottages belonging to the landed gentry. A few dozen steps in either direction brought one into the country, with its brooks and dog fish, its hedges and hedge hogs. As a boy Jenner had none of the ear marks of genius; which goes to show that many stub-nosed, freckled-faced and awkward boys of to-day are about to jump into greatness to-morrow. In observing the blemishes we are apt to overlook the clear cut mouths denoting initiative; and we fail to recognize the firmness in the eyes. We cannot place our fingers on these boys now, but they will

be the Darwins, the Huxleys, and the Jenners of to-morrow.

It is said that Jenner was the village truant from school. This often brought up an analysis of the wisdom of a certain Solomon in reference to sparing the rod and spoiling the child. It goes without saying that the verdict was always given according to Solomon. This habit of truancy, which could not be broken in Jenner, the boy, was the means of paving the way for the immortalization of Jenner, the man. His bucolic tendencies prevented him from learning many things which he might have had to unlearn in after years. It also taught him to depend upon his own powers of observation rather than on the precedents laid down by others. In other words it enabled him to use his head.

While despising the stereotyped drudgery of the schoolroom Jenner, nevertheless, had a passion for knowing things. His life in the fields gave him an acquaintance with nature. It also stimulated within him a desire to prove things for himself and when we reflect a minute we will see that every man who has cut his notch in scientific history has had this same craving for firsthand knowl-

edge. Herbert Spencer was not voicing an idle sentiment when he said, "The man to whom, in boyhood, information comes in dreary tasks along with threats of punishment, is unlikely to be a student in after years." To bear out this assertion let it be said that Jenner never saw a college before "walking" hospitals in London. His boyhood was spent in his own particular method of investigation and study. While lacking the polish given by a college curriculum he made up for it by a knowledge of nature and a freedom from conventional habits of thought. John Tyndall, Herbert Spencer, Thomas W. Huxley, John Stuart Mill, and Alfred Russell Wallace were similarly blessed. Thoreau thought so little of his university course that he refused his diploma on the grounds that the fee charged for it was in excess of its value, and Charles Darwin is known to have remarked that he received only one thing of value from his Alma Mater and that was the stimulation brought about by her disapproval of his work.

Jenner was fond of making excursions into the country, at which time he made a study of birds and gathered a collection of bird-nests. This collection, John Hunter insisted, was the most com-

plete to be found in England and John Hunter, it may be remembered, was himself a student of nature. His paper "On Bees," printed in the "Philosophical Transactions" of seventeen hundred and ninety-two, giving a minute description of the habits of the bee, is a masterpiece in bee culture. Naturally a compliment from one of England's greatest physicians and philosophers encouraged the boy. It was also the means of obtaining for him, from the previously irate father, the liberty to roam and study at his will.

In time the boy became acquainted with the peasantry for miles around. He knew all their wise saws and their traditions, many of which bore the foolish finger prints of superstition; but then, as now, ideas held by country people often bristle with common sense. A great financier once said that cities have no monopoly on wisdom but, be that as it may, one fact remains, that out of this heap of combined wisdom and intellectual rubbish, Jenner was destined to draw forth a nugget which was to save the race from small-pox epidemics, then its most terrible scourge.

One day, during his ramblings, Jenner stopped

to pass the time o' day with a dairy maid. Noticing a number of sores on her hands and arms he drew back startled and asked, "Is that small-pox?" The girl laughingly replied, "Of course not, I can never have that disease now for this is cow-pox." It is very improbable that a remark of this nature would make more than a casual impression upon a country boy, but the idea stuck, nevertheless, and was pigeon-holed, to be brought out a few years later, at a time when he was growing his pinfeathers in medicine as an apprentice of Mr. Daniel Ludlow, a physician of Sudbury. A country patient made a remark in his presence in reference to cow-pox warding off small-pox. This recalled to his mind the pustules on the dairy maid's fingers seen by him a few years before. It did more than this; it set his mental machinery into motion and gave him an idea: If this was true, why could not small-pox be controlled by substituting for it cow-pox, a comparatively harmless ailment. The more he thought about it, the more convinced he became that this method of prophylaxis against small-pox was feasible. As soon as possible he went to John Hunter and acquainted

him with the idea to which Hunter replied "Do not dream, boy; experiment; either prove it or disprove it."

Regardless of this advice, the idea seems to have lain dormant for a time, as Jenner was busy preparing the thesis on the habits of the cuckoo and the hedge hog, which won him a fellowship in the Royal Society. After receiving this much coveted honor he established himself at Berkeley where his patients were so few that for a time failure seemed imminent. This threatened calamity was fortunate, for it provided the impetus for hard thinking and the leisure in which to revert to his almost forgotten prophylaxis idea. Misfortunes, after all, are often but blessings in disguise. Few of us there are who have not seen the one-time discouragements and failures changed with the years into the pivotal points of our lives. The anticipated demand for the conventional plasters and the blood lettings of his time would have been gratifying to Jenner, there can be no doubt, but it would have marked him for oblivion.

It is interesting to note that Jenner was threatened with expulsion from his medical society at about this time because of his insistence that

small-pox could be prevented by inoculation with cow-pox virus. The notion was an interference with the conventional order of things and was met in the conventional way, by protest. Conventional order as applied to science is and always has been vicious because it impedes progress and because it does not take note of the fact that a thousand things in the darkness of the unknown to-day are about to spring into the light to-morrow.

In seventeen hundred and ninety-six Jenner was called in the case of one Sarah Nelms, a neighborhood dairymaid, who was suffering an attack of cow-pox. Obtaining virus from her arm, he inoculated a lad, Joseph Phipps, whose parents he had known years before. To prove the efficacy of this experiment, he received permission from the parents to re-inoculate the boy with the virus of genuine small-pox. The inoculation failed to produce any symptoms of the disease. Jenner saw that in this case at least immunization was successful and proposed other experiments which followed in rapid succession, all of which proved efficacious in combating subsequent inoculations with small-pox virus. His theory, so much laughed

at, was about to assume the proportions of a demonstrated fact.

In seventeen hundred and ninety-eight was published "An inquiry into the causes and effects of the Variolæ vaccinæ of Cow-pox," an essay which eventually was to make the practice of vaccination with cow-pox virus an accepted prophylactic against small-pox throughout the civilized world.

Previous to the practice of vaccination in England, the annual mortality of small-pox was seven hundred to each one hundred thousand people. At the beginning of the nineteenth century it was thirty to one hundred thousand people. Before Jenner's time this disease was the chief cause of the nation's blindness. Moreover thirty per cent. of all English children died of small-pox

Andrew D. White says that following Jenner's discovery, "the diminution in the number of deaths before they were three years old.
from the terrible scourge was amazing. In Berlin during the eight years following seventeen hundred and eighty three over four thousand children died of the small-pox; while during the eight years following eighteen hundred and fourteen, after

vaccination had been largely adopted, out of a large number of deaths, there were but five hundred and thirty-five from this disease. In Wurtenburg, during the twenty-four years following seventeen hundred and seventy-two, one in thirteen of all the children died of small-pox, while during the eleven years after eighteen hundred and twenty-two, there died of it only one in sixteen hundred. In London, formerly so afflicted by this scourge, out of all her inhabitants, there died of it in eighteen hundred and ninety but one. As to the world at large the result is summed up by one of the most honored English physicians of our time in the declaration that "Jenner has saved, is now saving, and will continue to save, in all coming ages, more lives in one generation than were destroyed in all the wars of Napoleon."

One would think that a blessing to humanity of this magnitude would not have had to run the gauntlet of bigotry, tyranny and oppression, unless he chanced to remember that but for a few apostles of scientific truth, great and heroic men who have dared to keep their faces toward the light, medicine would yet be where it was during

the dark ages. Just as bigotry, in the years past, has clung to the throat of human progress, skulking and making its attacks from the dark corners, so was it to give its usual welcome to vaccination. For several years Jenner was ostracized in England. That should not create surprise but we would expect more liberality in America. However, we soon find Timothy Dwight, President of Yale College, denouncing the new practice; and we find in Boston an anti-vaccination society composed largely of physicians who favored the suppression of vaccination by law as a practice "In deference of Heaven itself, even unto the will of God."

Ignorance of itself does not merit reproach; it is odious only when allied with the prejudice which condemns investigation and despises facts. These combined have always carried, and will always carry the black flag.

NOTE. A complete description of the opposition to vaccination both European and American is contained in "The Life of Jenner" by Barron.

SEMMELWEIS AND OBSTETRICS

SEMMELWEIS AND OBSTETRICS

FOR hundreds of years ignorance and superstition distorted the sentiment which is now associated with the function of motherhood. Labor during this period was but the primeval curse resting upon woman with a heavy hand. The prospective mother, it was believed, was about to give the world a new creature cursed with original sin and to afford her surcease from pain at such a time would be to thwart the designs of Providence itself.

Looking down on the now beautiful Princess Street of Edinburg, Scotland, is Castle Hill. Here in fifteen hundred and ninety-one a crime was committed which illustrates the old time psychology. Up this hill, one bleak morning, was forcibly dragged, Eufame MacLayne, a lady of rank and refinement. A few minutes before she had clung desperately to her twin babies, but these had been torn from her by the crowned bailiff. At the summit a stake had been driven in the

ground and around it wood, dry as tinder had been piled. As she knelt by this chains were wrapped around her body and in less than an hour ashes was all that remained of Eufame MacLayne. This execution was not the result of mob violence for the victim had been tried by due process of law and had been convicted. Evidence was advanced which proved that she had employed a mid-wife "one Agnes Sampson to administer unto her a certain medicine for the relief of pain in child birth contrary to Divine law and in contempt of the crown."

Eufame MacLayne's fate had been sealed by precedent. Convention had made it an insult to the Deity to assist a woman in labor. This was a crime which always drew the extreme penalty in medieval Europe. In fifteen and twenty-one Viethes, a Hamburg physician, was arrested for attempting to mitigate the pains of labor. By nature Viethes was generous and kind, and his patient, a frail woman, begged for relief. Her entreaties reached the heart of this good man

NOTE. "Darker superstitions of Scotland" by Dalyell gives a very complete description of the burning of Eufame MacLayne.

and he complied with her request. Immediately the wheels of the law began to turn and a conviction was soon obtained for the crown. A few weeks later an unusual light shone by night over Hamburg. They were burning Dr. Veithes.

For thousands of years antagonism to new ideas choked every independent thought, barred all scientific progress, and made of the ages past one long night of heartache and suffering. For the crime of thought Plato was sold into slavery in Aegina, Savanarolla was burned and Christ was crucified. Socrates, the rationalist, the anti-corruptionist, had the temerity to branch out into new mental fields, and for this he was convicted of heresy, of speaking lightly of the gods, and of seeking to corrupt the morals of the youths of Athens. Hypathia, the mental phenomonen of the fifth century, who founded the school of Neoplatonism, was killed by a mob in Alexandria, and Spinoza, that great and gentle Jew was excommunicated because he insisted on reading certain classics which his race frowned upon. The most hurtful habit of the human mind is this

NOTE. For an account of the trial and burning of Veithes refer to Brown's Medieval Medicine.

tendency to cling to traditions which have withstood the moss, rust and decay of the past. We seem to hold to our old thoughts with a veneration which is as infallible as it is inexplicable. This unhappy mental faculty makes the mind inaccessible to plain reason and leads towards intolerance.

But did not this spirit die with the middle ages, you ask? Well, not just that. Peter Cooper, the first man to dream of a free school system, was vilified and denounced as an anarchist. William Morris was arrested for advocating that property should be shared equally between capital and labor, and it will be remembered further that William Morris represented not labor, but capital. Walt Whitman was denounced for straying away from the beaten paths of thought and saw his "Leaves of Grass" excluded from the mails. Simpson, who first used chloroform in obstetrics, was ostracised: Thoreau was imprisoned for certain original ideas regarding taxation; and Theodore Parker was excluded from his church for taking too active an interest in oppressed humanity. The transcendental experiment at Brook Farm entered into by Emerson, Hawthorne, Charles Dana and

George William Curtis met with public censure. Had it occurred a few years earlier its originators would have been confronted with the fate of many of those who in the past ventured into new fields.

. . . . . .

One afternoon in eighteen hundred and forty-five Ignas Phillips Semmelweis, a young Hungarian physician, was on his way to Vienna to take up the advanced study of obstetrics. This youth was destined to be the instrument through which much of the traditional rubbish relative to obstetrics was to be cleared away and in its place was to be put one of the greatest single achievements of modern medicine.

Poverty had come to Semmelweis as a family inheritance. This was a distinct advantage for it sharpened his wits and increased his diligence. Poverty stimulates patience and perseverence and often makes success inevitable. Thousands of

NOTE. An account of the persecution awarded Simpson for advocating and using chloroform in obstetrics may be found in "Life of Sir J. Y. Simpson" by Dunn.

men, by virtue of this rather inconvenient asset, have attained their goal,—a goal that affluence would have put forever beyond their reach. Very few kronen were in the pocket of young Semmelweis that day in his stuffy third class compartment, but he carried with him a clear head, a generous heart and above all, a vision; he was to be of some service to the world.

At the Allgemeines Krankenhaus Semmelweis proved to be an earnest student and before his second month had passed we find him first assistant to Skoda and Rokitansky, then among the world's greatest obstetricians. Favored by nature with a happy faculty of keeping his eyes open he could not long fail to notice the deplorable unsanitary condition of his ward. No better breeding places could have been found for surgical sepsis than was provided, at this time, by the great hospital at Vienna. New cases were frequently put into the unchanged beds of patients who had died from disease. Dressings from wounds were dropped upon the floors, or were kicked out of sight under beds and tables and soiled linen was thrown about promiscuously for the ward scullion to remove at her convenience. Unscreened win-

dows gave admission to swarms of flies and the general atmosphere of the place was one of untidiness and filth.

The first ward in which Semmelweis worked was notorious for its mortality in puerperal cases. In a very few days every tenth child born in this ward was left motherless. Every day the tinkling of the little chapel bell announced that the deadly childbed fever had done its work. Semmelweis observed these cases with keen interest, and pondered, with a tinge of melancholy, over the apparent hopeless clinical picture which they presented. The patient enters the ward in good health, hopeful, and nerved for the ordeal. Labor progresses and the child is born. The mother sleeps, or lies awake picturing the future of the young baby nestling at her breast. Suddenly she becomes chilly, her teeth chatter and a sense of distress presents itself in the uterine region and increases until the pain becomes unbearable. Soon she is compelled to lie upon her back with her knees drawn up to relieve a rigid abdomen. The hopefulness disappears, for already she has read the verdict in the faces of her attendants. Her pain subsides but her nails are blue and her pulse has become thready.

An attendant leaning over her detects upon her breath a septic odor resembling new mown hay. Gradually she sinks, soon someone carries an orphan child away from the first ward, and again the tolling chapel bell tells of another obstetrical failure.

At this time a great many theories were current regarding the etiology of this disease. It was attributed by some to excessive modesty occasioned by being confined in the presence of men, by others to bad ventilation, to bad water, to improper food, and to disordered psychic states. By the older and more devout physicians it was thought to be the result of the Edenic curse, as evidenced by the writings of Meigs of Philadelphia, one of the greatest obstetricians of his time, who attributed the mortality in puerperal cases to the "justification of Providence; a judgement instituted to remind us of the sin committed by the mother of the race."

Semmelweis, with his depression deepening, because of the apparent hoplessness of the situation, implored Rokitansky to institute some form of treatment to reduce the death rate in his ward, only to be told bluntly that childbed fever, if not Providential, was at least an implacable decree of

nature that would never be made to respond to medical treatment.

Not to be lulled into apathy by the current opinions relative to the etiology, pathology and treatment of the disease, Semmelweis applied for permission to perform autopsies upon his fatal cases. Receiving this permission midnight often found him in the deadhouse dissecting, observing, pondering. The pelvis and abdomen of each deceased patient examined, presented evidence of a general peritonitis. The uterus was often bathed in pus, the "depots laiteux" or milk deposit, as it was called, a fluid believed by the old authors to be carried from the mammary glands to the womb by metastasis. And here it is interesting to remember that our term "milk leg" arose with this erroneous idea that in certain cases the milk may be vicariously carried throughout the body and may find lodgement in the legs.

Semmelweis continued to perform his post-mortems but the pictures presented did little more than add to his bewilderment, the real cause of this mortality escaped him entirely. One day while overworked, nervous and discouraged, he left the hospital for Venice determining to give up for all

times his investigations relative to the illusive cause of puerperal fever. Returning to Vienna a few weeks later he found his colleagues beginning an autopsy on the body of Kolletschka, another assistant of Rokitansky who had just died from septicemia the result of a wound received in the dissecting room. As he stood over the body of his former associate and heard the history of the case recited Semmelweis noticed that the pathologic picture was identical with those of his fatal puerpera of the first ward. Immediately he began to suspect that these, too, might have been due to infection carried to the mother from the dissecting room. He remembered that in the first ward the mortality was high and here the students came daily after finishing their dissections and made examinations of the women with hands bearing all sorts of contamination from the deadhouse. Reasoning along these lines he remembered that in the second ward the mortality was low. This ward was reserved for instruction of midwives who made no dissections. Here was what promised to be more than a clew. Were not the students from the deadhouse poisoning the women in

his ward and were not these women dying of septicæmia?

Semmelweis immediately adopted the expedient of having all his students wash their hands with a solution of chloride of calcium. In the next year the mortality of the first clinic sank from 9.99 per cent. to 3.6 per cent. This was sufficient argument to transform a theory into a fact; it made the evidence complete.

As soon as Semmelweis announced his discovery, orthodox obstetricians immediately opposed his innovation and denounced him. This was inevitable and its effect was salutary. Opposition always spurs to greater effort and very few men have ever gained their objective without it. In this case it provided the stimulation necessary to the preparation of his book "The Cause, Concept, and Prophylaxis of Puerperal Fever" a work which one day was to revolutionize the science of obstetrics.

Semmelweis' book was written while he was professor of obstetrics at the University of Budapest, and was published in eighteen hundred and sixty-one. By a strange coincidence Oliver Wendell Holmes at about the same time called atten-

tion to the contagiousness of puerperal fever in an essay "On the Contagiousness of Childbed Fever," but his efforts had ended with this essay which was unsupported by clinical evidence. It remained for Semmelweis to supply the proof. "The Cause, Concept and Prophylaxis of Childbed Fever" was not well received. As usual it interfered with the conventional methods then in vogue and disturbed traditional ideas. Soon the initial intolerance to Semmelweis and his contagion theory assumed the proportions of a persecution. In Austria he was bitterly attacked by Scanzoni and Carl Braun, and leading obstetricians throughout the world vied with each other in abusing, ridiculing and denouncing him, and characterizing his theory as an absurd imposition. The antagonism to the sepsis theory is well set forth by the following extracts from the textbook of Charles D. Meigs, the noted Philadelphia obstetrician.

"I prefer to attribute them (cases of puerperal sepsis) to accident or Providence of which I can form a conception," says Meigs, "rather than to a contagion of which I cannot form any clear idea, at least as to this particular malady." . . .

"In a crowded lying-in hospital there are many

servants and pupils, and physicians and other officers. There are also many unmarried women as, for example, the sisters of Charity, who wait on the sick. Often times the lying-in wards are nigh to fever wards or wards for the wounded. How is it that this contagion, which destroys like the most violent poison even in the duration of only eight hours—how is it I ask that other human beings, females and males, are never even suspected to be in danger?" . . . "I repeat, that the epidemic cause of childbed fever cannot affect other than women pregnant or lying-in; it must therefore be a feeble cause—else it would produce disease in unmarried women and girls as well as males."

The stigma which his work created goaded Semmelweis to reply in "Open Letters to Sundry Professors of Obstetrics." In these letters vituperation was repaid with denunciation. He accused obstetricians, by following the old and dirty methods, of being guilty of the crime of murder, and entreated the medical profession no longer to submit women to execution to uphold an outworn theory.

During the early part of eighteen hundred and sixty-five violent controversy played havoc with

the sensitive nature of Semmelweis. Brooding over the injustice of the attacks upon him he became insane. Physical disease set in and one night in November he died a martyr to the cause to which he had devoted his life.

The seed sown by Semmelweis lay for years on fallow ground. Long after his death obstetricians continued to smile at asepsis and to hold his theories in contempt. But this was all to be changed in eighteen hundred and sixty. In this year Pasteur discovered the rôle played by micro-organisms in the production of fermentation. From a knowledge of fermentation to the study of putrefaction in wounds was only a step and soon this step was taken by the immortal surgeon Joseph Lister. When Lister saw his principles of antiseptic surgery accepted by the scientific world he magnanimously proclaimed Semmelweis as his forerunner. Thus was the bitter controversy ended.

In Budapest rises a monument to the memory of the father of scientific obstetrics, erected by the women of the world as a token of their devotion and gratitude, and nearby under a mossy slab, rests the body of the great obstetrician. To this spot pilgrims from many lands have gone and have

poured out their adulation over his tomb without thinking, perhaps, how much a single sentence of this appreciation would have meant to the great and tender man before death, which rights all wrongs and heals all heartaches, laid upon him its heavy hand.

LONG AND ANÆSTHESIA

LONG AND ANÆSTHESIA

ANÆSTHESIA was not unknown to the ancients and even to primitive man. In its earliest periods the human race became familiar with crude methods of surgery. This frequently was demonstrated by the explorers of the past who found in newly discovered countries people, often in the crudest state of savagery, who had considable knowledge of the healing art, who set broken bones, applied pressure for the control of hemorrhage and administered certain herbs for the purpose of producing unconsciousness of various degrees.

S. J. Morans, in his book "Along the Andes and Down the Amazon," calls attention to the intricately trephined skulls of an ancient Peruvian race great numbers of which have been found. Some of these skulls were examined in eighteen hundred and seventy-three by Dr. Paul Broca, the localizer of the convolution which bears his name, and it was pointed out by him that they belonged to an

early neolithic race existing ten or twelve thousand years ago. The operation upon these skulls seems to have been done by scraping with sharp flint, a tedious process which must have occupied hours. Descendants of these same people are today using the juice of the erythroxylon coca, which has always grown abundantly in this region, often to the point of extreme unconsciousness, and Morans relates a case of anæsthesia coming under his observation in which a modern chewer of coca leaves, while under the influence of the drug, had his foot cut off without manifesting the slightest evidence of pain. It is quite probable, then, that the operation done by the Peruvians was actually performed under anæsthesia and that the anæsthetic used was derived from the coca-plant.

While the records of the past in reference to the use of drugs to relieve pain and to produce unconsciousness are scanty and uncertain there are many accounts in ancient literature which point conclusively to medicine so used. Mandrake is mentioned by Pliny and Celsus and in the writings of Moses we find Rachael seeking to procure this drug from Leah probably, as suggested by Garrison, to be used as an analgesic in labor.

Indian hemp is thought to have been used by the ancient Egyptians as an anæsthetic. On departing this life the deceased was embalmed and placed in the tomb to await the tribunal of another world, and with him were deposited formulæ for all possible exigencies occurring after the great tribunal. Here were placed numberless objects which are now known to have been talismans to ward off disease, curious symbols to promote good luck and formulæ for exorcisms against evil spirits, together with leaves of the hemp plant, supposedly to dull his consciousness should the ordeal before Osiris be unfavorable.

There is every reason to believe that the Greeks were familiar with the anæsthetic properties of certain drugs long before the fatal draught of hemlock was handed to Socrates, for in the Odyssey Homer tells us of a sorrow-easing drug which Helen procured to be cast into the wine drunk by Ulysses. Some passages in the Arabian Nights, says Sir Richard Buxton, point to the use of anæsthetics and he adds that drugs to produce unconsciousness during surgical operations were in use throughout the East for centuries before ether or chloroform became the fashion in the civilized

West. This claim seems to be borne out by the supposed fact that Hao-Tho, a Chinese physician who lived fifteen hundred years ago, used Cannabas Indica to produce insensibility during the performance of surgical operations.

It is a matter of wonder that such a boon to humanity as anæsthesias was, even in its crude state, could ever have been forgotten. That from operations performed with the subject in dreamless sleep the race should drift into the terrifying surgery of the middle ages, where the relentless surgeon worked amid shrieks and screams, where the operating room was a hell and its memory a nightmare, is beyond our comprehension. But we have already noted that for one hundred years prior to, and several hundred years following the burning of the Alexandrian library science gradually retrograded. During this period a knowledge of anæsthesia was lost and remained so until one day, within the memory of many persons living, an unknown country doctor in an obscure village in Georgia re-grasped the old secret which was again to bless the world, and from whom the world was long to refuse him credit.

On a November day, eighteen hundred and forty-one, Crawford Williamson Long, a young man fresh from a Philadelphia medical college, hung out a shingle in the little village of Jefferson, Georgia. Jefferson was then a cross road far from a railway and with its nearest hospital at New Orleans, four hundred miles away. A distinct advantage is afforded by such a beginning for the young physician thus placed must depend upon his wits or fail ingloriously. J. Marion Simms, Ephraim McDowell, John Wyeth, and John Y. Bassett, illustrious physicians of the southland, were thus favored. In their younger years these men were all familiar with the application of blisters, occasional phlebotomies, endless delving into well worn saddle bags and the simple surgery of the community where extreme necessity demanded it. There were no medical centres then into which they could thrust their difficult cases and in doing so be robbed of their initiative. They had to be equal to all emergencies, the versatility thus acquired paving their way, step by step, for future leadership in both thought and progress. The climb to the top of the ladder never begins at the middle round.

During the first year of Long's practice an itinerant lecturer arrived in the community and told his auditors strange stories about the exhilaration that might be obtained from a peculiar preparation known as "laughing gas." Some persons who had attended the lecture applied to the young physician for a sample of this gas and not having the means of preparing nitrous oxide Long suggested that the same results might be obtained from sulphuric ether, a quantity of which he had in his possession. A number of young men while inhaling this drug in Long's office received bruises which were unaccompanied by pain. The discovery was the result of the accidental observation of this fact and because of this, it has been contended, is robbed of its lustre. But have not accidental observations been the result of many of the world's greatest scientific achievements? From the casual observation of a lamp swinging in a cathedral of Pisa came the pendulum the development of which has given us the intricately delicate modern time piece. By the merest accident a distant church spire seems enlarged when seen through two reading lenses of different strength. Then came the telescope and now countless worlds are brought within our view.

A tea-kettle forcibly ejects a stopper from its spout and as a result of the observation of this trivial incident the world resounds with the hum of industry the motive power of which is steam. By chance a diminutive canal is noticed in the fang of a serpent and from this observation has come the hypodermic needle from which has been developed our intravenous therapy. Illustrations of this kind could be multiplied indefinitely. Long's idea that if a small amount of ether would prevent the pain arising from a contusion, a larger amount would produce unconsciousness of such a degree as to make of surgery a painless process, was a logical deduction arrived at only after a true process of philosophic reasoning and for this the world must always give him credit.

In eighteen hundred and forty-two Long performed the first surgical operation under anæsthesia ever done in modern times. A description of this operation can be given in no better words than those used by the great discoverer in an essay published in The Southern Medical and Surgical Journal, December, eighteen hundred and forty nine. "The first patient to whom I administered ether in a surgical operation," Long states in this

paper, "was Mr. James M. Venable, who then resided within two miles of Jefferson, and at present lives in Cobb County, Georgia.

"Mr. Venable consulted me on several occasions in regard to the propriety of removing two small tumors situated on the back part of his neck, but would postpone, from time to time, having the operation performed from dread of pain. At length I mentioned to him the fact of my receiving bruises while under the influence of vapor of ether without suffering, and as I knew him to be fond of and accustomed to inhale ether, I suggested to him the probability that the operation might be performed without pain, and proposed operating on him while under the influence. He consented to have one tumor removed and the operation was performed the same evening. The ether was given to Mr. Venable on a towel, and when fully under its influence I extirpated the tumor. It was encysted and about half an inch in diameter. The patient continued to inhale ether during the time of the operation and, when informed it was over, seemed incredulous until the tumor was shown him. He gave no evidence of suffering during the operation and assured me after it was over, that he did not

experience the least degree of pain from the performance. This operation was performed on the 30th of March, eighteen hundred and forty-two."

Within the next three years Long operated upon several patients under the influence of ether anæsthesia two of these operations being amputations of toes and fingers, and though he made no attempt to conceal his discovery, which was known to the medical profession locally, he did not at once publish the facts relating to it. At a later time, when further research and repeated operations under anæsthesia should make his report sufficiently comprehensive to obtain recognition, he meant to do this. Unfortunately the report was still on its making when in eighteen hundred and forty-nine W. T. Morton, a dentist of Boston, petitioned congress for a grant of money as a reward for his discovery of ether anæsthesia. This petition awakened what has been since known as the ether controversy, a bitter contest occupying congress for years and one in which Long at first took no part.

By congressional investigation occurring as a part of this controversy the following facts were brought out: That in eighteen hundred and forty-four Horace Wells a dentist of Hartford, Conn.,

extracted teeth without pain with patients under the influence of nitrous oxide gas and that following a fatal case of anæsthesia Wells committed suicide. That in eighteen hundred and forty-six W. T. Morton a dentist of Boston, at the instigation of Dr. D. C. T. Jackson, performed a painless extraction of a tooth with the patient under the influence of sulphuric ether. It was proved during this investigation that Morton sought to keep his discovery a secret by applying for and obtaining a patent for "Letheon" a preparation composed of sulphuric ether and a number of ingredients added for the purpose of disguising it. Fortunately for a suffering world the drug is incapable of concealment and the patent became valueless. Failing in the courts to establish protection he then made application to congress for a grant of money to repay him for the blessing he claimed to have conferred upon humanity. Immediately Jackson and the friends of Wells, then dead, opposed Morton's claim of priority in anæsthesia. A committee was then appointed which, be it recorded to their credit, brought in a report on February twenty-eight, eighteen hundred and forty-nine which closes with the following paragraph:

"He" (Morton) "was the first to suggest and urge a patent" (for ether) "and that within twenty-four hours after the discovery is brought to his knowledge he employed a patent soliciter to subdue the 'old and exploded prejudices' of his co-partner, and to hasten the consummation of the enterprise. He anxiously seeks means to prevent the recognition of the agent by changing its odor. Had he succeeded in this wicked attempt his brightest anticipation would have been realized. But failing in his scheme to speculate in the suffering of mankind which, in our judgement, is ten times more culpable than the speculation in the necessaries of life, he memorializes the Congress of the United States to make good from the National Treasury what he failed to extort from the National sufferings." Acting upon this report Congress refused to have the government mulcted in Morton's favor.

The same evidence presented to this committee having previously been reviewed by the French Academy of Science caused this body on January thirty-first, eighteen hundred and forty-nine to award to Doctor Charles T. Jackson, its Cross of the Legion of Honor, in commemoration of the

discovery of ether anæsthesia. In the following extract from an essay appearing in The Boston Medical and Surgical Journal during the year eighteen hundred and sixty-one, Doctor Jackson gives us the most magnanimous example in medical literature. In this article Jackson set forth the claim that the honor which the French Academy had conferred upon him twelve years before belonged rightfully to Long. "At the request of the Hon. M. Dawson, United States senator from Georgia," he writes, "on March eighth, eighteen hundred and fifty-four, I called upon Dr. C. W. Long, of Athens, Georgia, while on my way to the Dahlonega gold mines, and examined Dr. Long's evidence on which his claims to the first practical operation with ether in surgery were founded, and wrote, as requested, to Mr. Dawson, who was then in the U. S. Senate, all I learned on the subject. From documents shown me by Dr. Long, it appears that he employed sulphuric ether as an anæsthetic agent:

Ist, March 30th, 1842, when he extirpated a small glandular tumor from the neck of Jas. M. Venable, a boy in Jefferson, Ga. now dead.

2nd, July 3rd, 1842 in the amputation of the toe

of a negro boy belonging to Mrs. Hemphill, of Jackson, Georgia.

3rd, September 9th, 1843, in extirpating a tumor from the head of Mary Vincent, of Jackson, Georgia.

4th, January 8th, 1845, in the amputation of a finger of a negro boy belonging to Ralph Bailey of Jackson, Georgia. Copies of the letters and depositions proving these operations were all shown me by Dr. Long. I have waited, expecting Dr. Long to publish his statements and evidence in full, and therefore have not before published what I learned from him. He is a very modest retiring man, and not disposed to bring his claims before any but a medical or scientific tribunal. Had he written me in season I would have presented his claims to the Academy of Science of France but he allowed his case to go by default, and the academy knew no more of claims to the practical use of ether in surgical operations than I did."

It is a remarkable fact that, in spite of this evidence given the world by Jackson, the credit for the discovery of anæsthesia was for many years, to go to Morton. This was due to the powerful influence of two men, Dr. John Collins Warren, and

Dr. Henry J. Bigelow, both of whom had performed operations with ether administered by Morton and through whose writings, widely read in both America and Europe, the discovery became known. Whether anticipation of honor for themselves, if the world could be brought to accept their surgery as the first done under the influence of ether, had anything to do with the conclusions of these men we do not know but at least it was very human, under the cicumstances, to champion the cause of Morton. Their claim gained much additional strength through the writings of Oliver Wendall Holmes, who proposed the term "anæsthesia" and who accredited to Morton the honor of first administering ether. Thus were the rights of the modest Georgian physician buried under a mass of superior influence and almost forgotten, but later his case was reopened by his friends and the evidence, freed from its entanglement of prejudice, was reviewed with the only possible conclusion: Long discovered ether anæsthesia.

In 1896 Dr. Hugh H. Young of Johns Hopkins Hospital read a paper on anæsthesia before the Johns Hospital Historical Society in which a complete review of the documentory evidence bearing

on the ether controversy was made and in which he gave Long the credit for the discovery of ether anæsthesia. In 1912 the University of Pennsylvania, after an investigation similar to that made at Johns Hopkins, celebrated the seventieth anniversary of ether anæsthesia and struck a bronze medal in commemoration of its originator, Dr. Crawford W. Long. Dr. Geo. Foy of Dublin, in his book "Life of Crawford Williamson Long, Discoverer of General Anæsthesia," established proofs of Long's claim and forever closed the ether controversy in Great Britain. The American Text Book of Surgery now gives Long credit for his great discovery, and so does nearly every authoritative work on anæsthesia appearing throughout the world during the last decade.

Long died at Athens, Georgia, June fourteenth, eighteen hundred and seventy-eight. It is to be regretted that the laurels of discovery were withheld from him during his life time, but we are grateful for the fact that the great arbiter, time, has at last meted out final justice and has left to his memory the honor of having been the originator of practical anæsthesia.

THE END